TOOL DIE MACHINE
PROGRESS
The National Tool and Die Journal

Whatever You Require In *End Mills*

No line of end mills is more complete than that offered by Putnam. A full range of sizes and exactly the types of cutters best suited to specific jobs are manufactured as standard.

Of more importance, in meeting *your* requirements, is the way these end mills will perform on your work. It has been proved in impartial tests that, with Putnam End Mills, you can get approximately 30% more speed and close to 100% longer life. When you specify Putnam Hi-Speed End Mills, you are sure of getting the exact sizes and types of cutters you need, and unequalled cutting performance and durability.

OUR COMPLETE CATALOG IS YOURS FOR THE ASKING

PUTNAM *Hi-Speed* END MILLS

PUTNAM TOOL CO. • 2985 Charlevoix Ave. • Detroit

UGUST
940

culation
re than
3,000

Change the *"IF"* to *"OK"* on Your Deliveries

In spite of the pressure on you, the only way you can speed up deliveries is to use equipment that will get your work done faster. That is why the Grindrite and its Companion Work Bench is so indispensable to scores of tool rooms and die shops. The sturdy, portable Grindrite removes stock rapidly —reaches surfaces otherwise hard to grind—saves up to 50% of your grinding cost.

The Companion Work Bench, equipped with vise and hand tools for final fitting, layout or assembly, is also portable. Together the Grindrite and Companion Work Bench can be taken from job to job, cutting down the "running around" time in the shop.

Write for Catalog and list of users

SPECIFICATIONS:

Height	Approx. 58 inches
Floor Space	Approx. 29" x 33"
Weight	Approx. 600 lbs.
Motor:	1 HP—1750 RPM—220 or 440 V.
Grinding Wheels:	8" dia. 3½" face.

Die Service

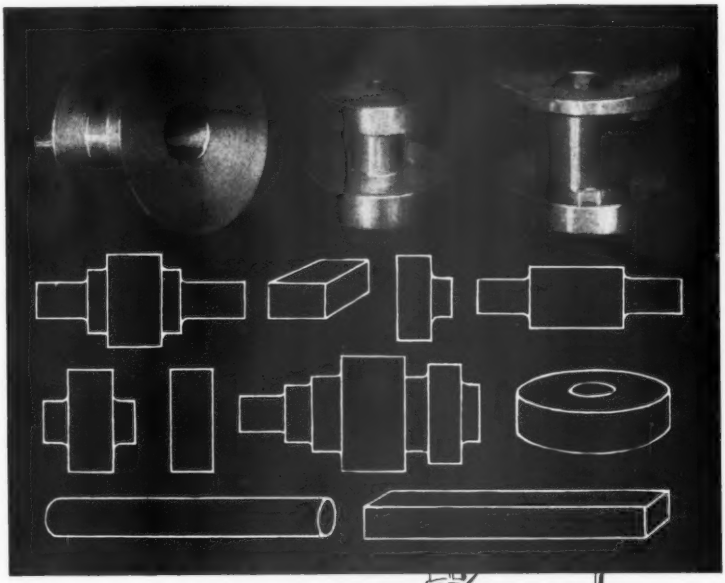
Our die designing and building service—particularly of medium and large dies—is used by many nationally known production industries. A pattern shop and try-out presses are a part of our complete, modern facilities.

Largest Independent Die Builder

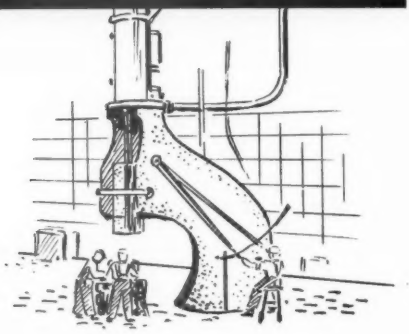
KOESTLIN TOOL & DIE CORP.

3601 HUMBOLDT AVE. **DETROIT, MICH.**

STAINLESS STEEL FORGINGS



- RINGS
- DISCS
- BLOCKS
- BARS
- SHAFTS
- SPINDLES
- HUBS
- SHAPES



Heat Treating · Rough Machining

QUALITY FCC SERVICE

THE FORGING and CASTING CORPORATION

FERNDALE (DETROIT) MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

Copyright 1940 by
George J. Huebner

TOOL·DIE·MACHINE PROGRESS
The National Tool and Die Journal

—

Editor
George J. Huebner
Assistant Editor
Paul L. Reed

—

Official Organ of the Special Tool, Die and Machine Shop Institute

Vol. 6 **AUGUST, 1940** **No. 5**

CONTENTS

Designing and Estimating a Side or Cam Action Piercing Die—by Charles Bohmer and George Dannes 15
Methods for Accurate Locating of Work (Cont'd)—by E. G. Marshall 19
The Design of an Ejector-Pin Type of Mold—by Gordon B. Thayer 22
The Tool and Die Shop and National Defense 28
Buy With Confidence Section 35
Contract Shops 44
Advertisers' Index 50

Mac-it Makes It!
Where else can you obtain 16 different kinds of heat-treated, alloy steel screws — all standard? Or any other type made to your specifications, and with Mac-it's quarter century of experience in making top quality products?
Mac-it's are the only complete line of heat-treated alloy steel screws on the market. And they're Good!
Write for your catalog.
THE STRONG, CARLISLE & HAMMOND COMPANY
1393 West Third St., Cleveland · Ohio

Tool·Die·Machine PROGRESS
2460 Fairmount Boulevard, Cleveland, Ohio
GEORGE J. HUEBNER, *Publisher*,
Telephone YEllowstone 4040
Advertising Representatives Macfarland & Heaton, 289 Fourth Avenue, New York, N. Y.
Telephone GRamercy 5-2380

When you order or write about products described in TDM PROGRESS please mention the publication.

DO-ALL Contour Machine BAND SAWING BAND FILING BAND POLISHING

Service Die & Engineering Company, Detroit, made this complete die on the DoAll. It is used to make the glove compartment on the instrument panel of a well-known automobile.

Die

DIE—2¼" thick mild steel was sawed out in 1¾ hours.

Pad

PAD—1½" thick air die steel, sawed out in 2½ hours. 25 pounds of steel were saved.

STRIPPER—¾" cold roll, sawed out in 45 minutes.

Stripper

KNOCKOUT—¾" cold roll, sawed out in 30 minutes.

Knockout

CAM DRIVES—(on the DoAll table)—2½" oil hardened tool steel, sawed out in 20 minutes each. Later they were welded to base.

Cam Drive

Two DoAll Contour Machines and one DoAll Band Filer are kept busy 24 hours a day in this modern plant.

The DoAll is a moderately priced, rugged machine tool that replaces shaping, milling and lathe work with enormous savings of time, labor and metal.

Send for Free 158-page Metal Working Handbook

CONTINENTAL MACHINES, INC.

1303 S. Washington Ave., Minneapolis, Minn.

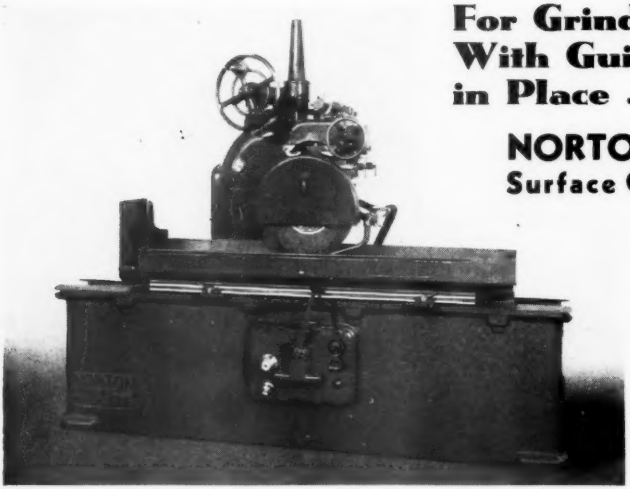
☐ Send data on the DoAll. TDM-8

☐ Send Free Handbook.

Name .....

Address .....

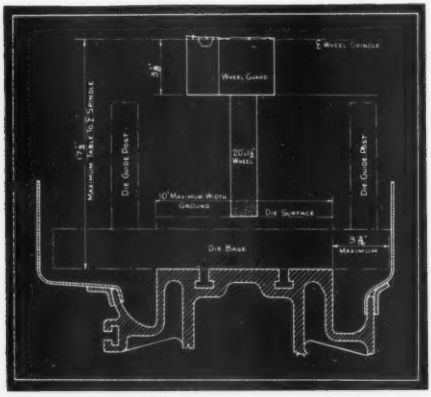
When you order or write about products described in TDM PROGRESS please mention the publication.



10 x 48" Norton Hydraulic Surface Grinder for Die Shops

For Grinding Dies With Guide Posts in Place . . .

NORTON 10" Surface Grinder



THE Norton 10" Surface Grinder with 20" grinding wheel is ideally suited for grinding dies with guide posts in position. This is a particularly important feature since permanent pins can be used. Dies can be kept in better condition because regrinding is easier and more economical. New dies can be finished quicker and at less cost.

The cut at left illustrates the capacity of the Norton Surface Grinder for die shops. A study of it shows the variety of dies with pins which can be ground.

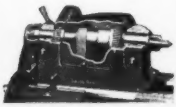
Further information gladly furnished upon request.

NORTON CO., Worcester, Mass.
New York Chicago Cleveland
Detroit Hartford

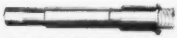
M-422

When you order or write about products described in TDM PROGRESS please mention the publication.

Precision is Assured IN A SOUTH BEND LATHE

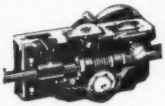


HEADSTOCK. Cutaway view showing integral type bearing and the capillary oiling system.

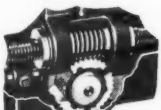


SUPERFINISHED SPINDLE is made of alloy steel with bearing surfaces carburized, hardened, ground and superfinished.

IMPROVED SADDLE and compound rest with adjustable tapered gibs. Cross slide bridge is wide and deep, providing rigid support for the tool rest.

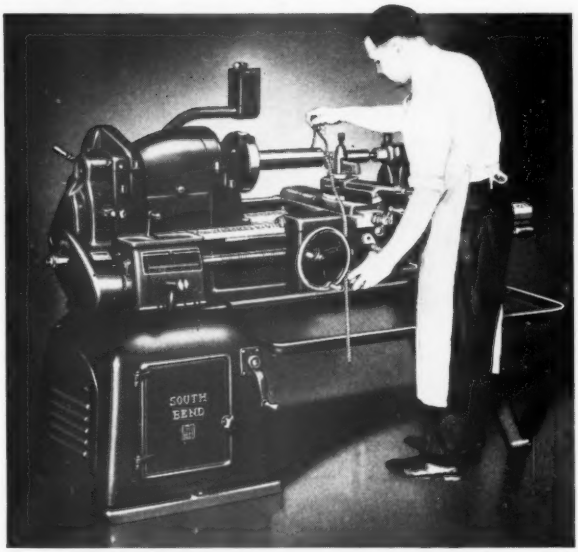


DOUBLE WALL APRON is rigid box type construction with all steel gears running in oil bath.



MULTIPLE DISC CLUTCH. Cutaway view shows alternate keyed steel disc construction.

UNDERNEATH MOTOR DRIVE. Belt drive to spindle is smooth and powerful and provides a wide range of spindle speeds.



PRECISION IS ASSURED in South Bend Lathes by combining fine workmanship with sound machine design. Expert mechanics fit each unit with an exactness known only to the machine tool builder.

South Bend Lathes are used in tool rooms of nationally known manufacturers for the most exacting classes of precision work. They are also used for production operations on interchangeable parts requiring a high degree of accuracy. Conveniently located controls assure an ease of operation which results in a uniformly efficient rate of production over a long period of time.

South Bend Lathes are manufactured in over 65 sizes and types. Popular sizes are available for delivery from dealer display stocks in important cities. Made in 9", 10", 13", 14½", and 16" swing, in 3' to 12' bed lengths, in Countershaft and Motor Drives.

ON DISPLAY IN ALL PRINCIPAL CITIES

Baltimore, Md.–Carey Machinery & Supply Co.
Chicago, Ill.–South Bend Lathe Works*
Bridgeport, Conn.–A. C. Bisgood
Buffalo, New York–R. C. Neal Company, Inc.
Cleveland, Ohio–Reynolds Machinery Co.
Detroit, Mich.–Lee Machinery Company
Los Angeles, Cal.–Feeles & Dasses Mach. Co.
Milwaukee, Wis.–W. A. Voell Machinery Co.
Newark, N. J.–J. R. Edwards Machinery Co.
New York, N. Y.–A. C. Colby Machinery Co.
Philadelphia, Pa.–W. B. Rapp Machinery
Pittsburgh, Pa.–Tranter Manufacturing Co.
Providence, R. I.–Geo. T. Reynolds & Son
Rochester, New York–Ogden R. Adams
San Francisco, Cal.–Moore Machinery Co.
York, Pa.–York Machinery & Supply Company

*Chicago Sales Office Room 308, Machinery Sales Building. Phone State 7283

SOUTH BEND LATHE WORKS

LATHE BUILDERS SINCE 1906 199 E. Madison St., South Bend, Ind., U.S.A.

When you order or write about products described in TDM PROGRESS please mention the publication.

PRECISION

Dependable Quality

DANLY DIE SETS AND DIE MAKERS' SUPPLIES FROM THE 9 DANLY BRANCH STOCKS

DANLY MACHINE SPECIALTIES, 2121 So. 52nd Ave., Chicago, Ill.

LONG ISLAND CITY, N. Y.
36-12 34th STREET

CLEVELAND, OHIO
1745 ROCKWELL AVENUE

ROCHESTER, N. Y.
16 COMMERCIAL STREET

DETROIT, MICHIGAN
1549 TEMPLE AVENUE

DAYTON, OHIO
990 E. MONUMENT AVENUE

MILWAUKEE, WIS.
513 EAST BUFFALO STREET

PHILADELPHIA, PA.
3913 N. BROAD STREET

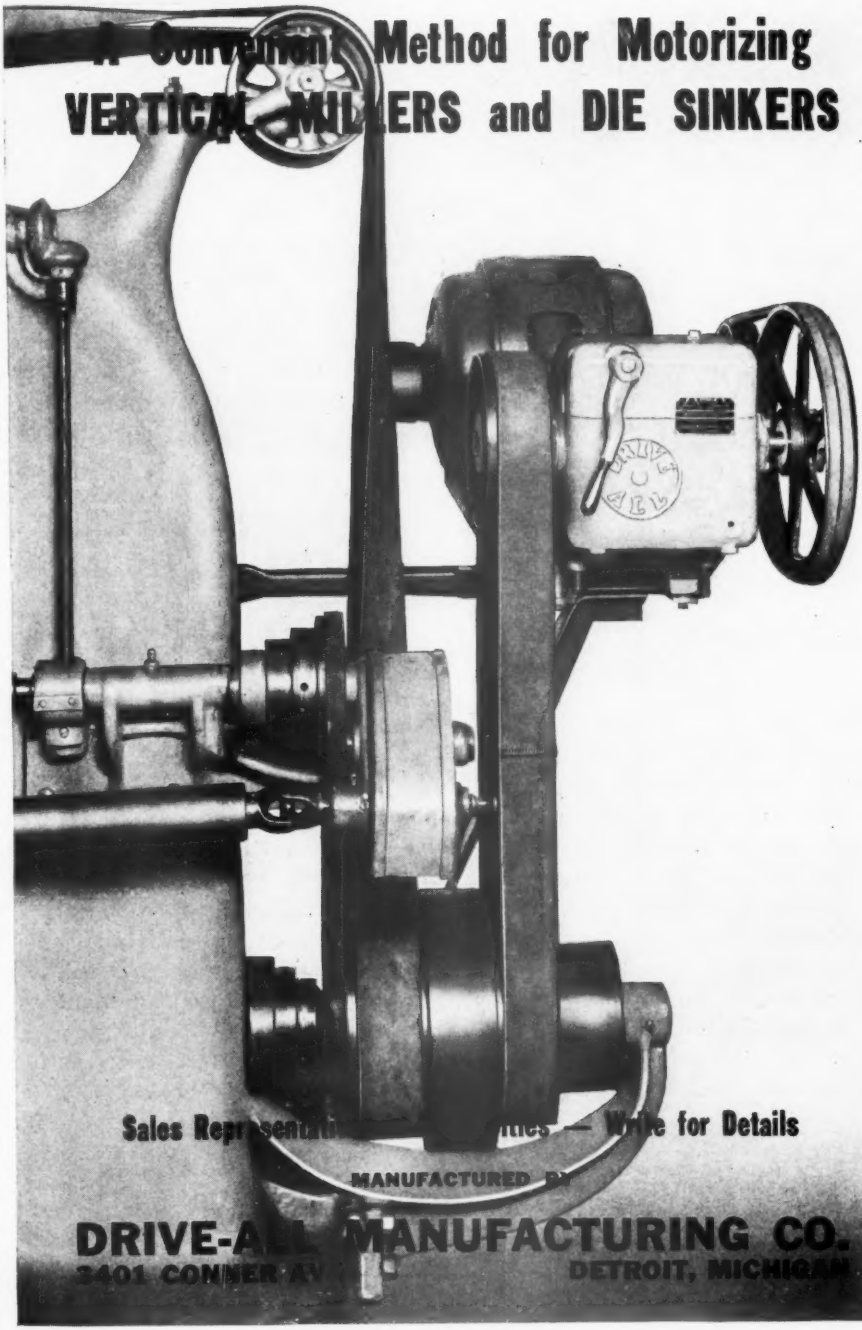
DUCOMMUN METALS AND SUPPLY CO. • Los Angeles • San Francisco

DANLY PRECISION DIE SETS

DANLY DIE SETS and DIE MAKERS' SUPPLIES

A Convenient Method for Motorizing

VERTICAL MILLERS and DIE SINKERS



Sales Representa[illegible]ities — Write for Details

MANUFACTURED BY

DRIVE-A[illegible] MANUFACTURING CO.

2401 CONNER AV[illegible] DETROIT, MICHIGAN

WHICH WHEEL

will produce the best results for you?

● Here are two Aloxite Brand Aluminum Oxide Wheels that have been especially designed for tool room use . . . to help you get better work, in less time, at lower cost. They are the "AA" *white* wheel for special tool room jobs, and the "200 Bond" *blue* wheel for production work on duplicate pieces.

No matter what grit, grade or shape of wheel you require for each tool room job, you'll find it in the *white* "AA" or *blue* "200 Bond." And you can depend on these wheels to cut fast (even with light grinding pressures) . . . to produce fine finishes and close tolerances . . . to cut cool.

The wheel that will produce the best results for you depends upon the particular condition in *your* tool room. Carborundum Sales Engineers will be glad to help you choose the right wheel for each of your needs. Write our nearest office for information.

CARBORUNDUM
ABRASIVE PRODUCTS

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

Niagara Falls, N. Y.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company)

When you order or write about products described in TDM PROGRESS please mention the publication.

Street cars like this were used for many years, and there may be some in use today. But if one **did** stop at the corner, and a nice fast-moving bus drew up at the same time . . . which one would you take?

Considering the quality of workmanship produced and the speed and efficiency of performance, is it any wonder that "old-time" slow methods cannot compete with BOYAR-SCHULTZ PROFILE GRINDERS?

Grinding curved surfaces and irregular shapes so frequently encountered in tool and die making is better done in minutes with BOYAR-SCHULTZ PROFILE GRINDERS instead of hours required in the old-fashioned manner.

Users have discovered that the high spindle speed makes possible the use of small wheels in confined openings and small radii, with rapid removal of stock.

We'll be glad to send you full particulars. . . . Please write us.

BOYAR-SCHULTZ CORPORATION

2112 Walnut Street « » Chicago, Ill.

When you order or write about products described in TDM PROGRESS please mention the publication.

Master Die Sets and Die Service

See For Yourself Why Die Supply Can Give You the Best Service —

in nearly all cases we ship or deliver orders the same day they are received.

One section of our stock room. A complete stock of Producto Die Sets and a full line of die accessories are carried.

We assemble pins and bushings on our Press, lap the bushings and carefully inspect all sets so that every die set will do all you may expect of it.

Our Master Die Sets are the best that can be had for precision dies; our Standard Die Sets are above average in quality and workmanship. Both are the best that money can buy. In addition, you will appreciate our fast service.

We carry a complete line of parts and die accessories.

A post card will bring a Catalog and full information.

DIE SUPPLY COMPANY

J. R. Fitzsimmons W. H. Fitzsimmons Jos. T. Fitzsimmons

Telephone CHerry 6818

1390 East 30th St. Cleveland, O.

When you order or write about products described in TDM PROGRESS please mention the publication.

DoALL BAND SAWS

MEET AMERICA'S ORDER FOR SPEED

Not only the speediest saws ever designed, but the cleanest cutting. CHIPS TELL THE STORY

DEVELOPED FOR USE ON THE DOALL CONTOUR MACHINE, THE WORLD'S FASTEST PRECISION SHAPE CUTTING MACHINE TOOL

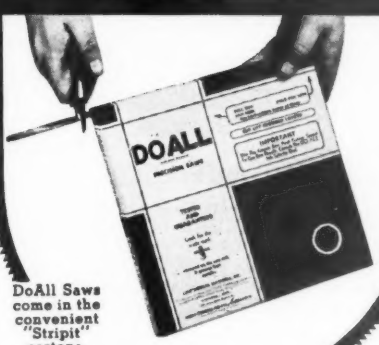
There's a DoAll Band Saw for every kind of metal regardless of toughness, ductility and hardness. Send for interesting research booklet on such metals as:

S.A.E. 3150 heat treated to 33—39 C Rockwell
Laminated Low Carbon Steel Sheets
Cold Rolled Nickel
Very Ductile Aluminum Alloy
Roller Bearings
4" thick Cast Brass
3/16" Neoprene Sheets
3" Cast Iron
Laminated Bakelite Strips.
Semi-steel Castings
Grade "C" Piping

Poor Chips from other saws.

Curled, Clean DoAll Cuttings

DO SAWS ALL



DoAll Saws come in the convenient "Stripit" cartons, originated by DoAll

Take advantage of our Free Offer to make tests on any tough sawing job.

Stocks and Service Everywhere. Consult your phone book or write us.

DoALL SAWS

(Division of Continental Machines, Inc.)
1203 Thacker St.
Des Plaines, Illinois

TDM-8

☐ Send booklet "Actual Performance Records of DoAll Saws"

☐ Send details of Free Saw Test Offer

Name _____

Address _____

When you order or write about products described in TDM PROGRESS please mention the publication.

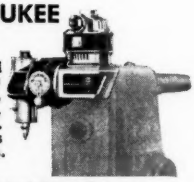
THE Milwaukee Midgetmill is specially designed to get the most from end mills and milling machines by providing the correct high speeds that mean smooth, clean, accurate work and long tool life. Adaptable to any milling machine — completely universal —mills, drills and bores—fast, safe and easy to set up.

KEARNEY & TRECKER CORPORATION
MILWAUKEE, WISCONSIN

The "THOU-METER"

—exclusive with the Milwaukee Midgetmill. Set cutting tools by direct reading —merely touch tool to work, set dial at zero, and mill, drill and bore until dial shows correct reading—in thousandths. No graduations—no dials—no stops—no binding screws. Accurate to plus or minus .00025 inch in its 2½ inches of travel.

The MILWAUKEE SPEEDMILL



— for end mill speeds up to 5200 r. p. m. Accurate, easy to operate, improved finishes. Adapted to all types of milling machines.

Write now for complete information on the MILWAUKEE MIDGETMILL and SPEEDMILL—built to the same quality standards as Milwaukee Milling Machines.

Products of

KEARNEY & TRECKER CORPORATION
MILWAUKEE MILLING MACHINES

When you order or write about products described in TDM PROGRESS please mention the publication.

TOOL · DIE · MACHINE PROGRESS
The National Tool and Die Journal
AUGUST, 1940 Vol. 6, No. 5

Die Designing and Estimating

By CHARLES BOHMER
and
GEORGE DANNES

Article V of a New Series

Because the side or cam action type of piercing die designed and estimated this month operates very economically, particularly for piercing more than one hole, the relatively high building costs of this type of die are more than compensated for. The longer-than-necessary center post on this die is designed for use with a longer part. Different thicknesses of filler blocks may be used (or none at all) to give a range of piercing possibilities.

—*The Editor.*

Design and Estimate of a Side or Cam Action Piercing Die

Analysis of Design and Application of Method for Estimating Time Required to Machine and Assemble Parts

Design

THIS type of die is frequently used for various forms of piercing, particularly when more than one hole is to be pierced. Substantial economy in operation warrants the increased cost of this type of die, which is somewhat limited, however, in that the piece part being pierced must be large enough to allow a secure and maintainable center post or die.

The die as illustrated is used to pierce two .195" diameter holes diametrically opposite in a shell as outlined. The operation of the die is as follows:

First, the shell is placed over the center post (8); and, as the punch holder assembly descends, the spring pad (7) clamps the part securely in place; then, as the motion continues, the upper cams (3) actuate the slides (4) containing the perforators (5), moving them forward until the perforators enter the die buttons (10), completing the operation. As the punch holder assembly ascends the upper cams release the slides which, in turn, are pulled back by the springs and studs as shown, stripping the perforators from the piece part, leaving it free

to be removed. The die is then ready to receive another part.

The slides and gibs (4) and (9) are made of machine steel carburized, hardened, ground and accurately fitted to slide freely with as little clearance as possible. The heel and spring thrust blocks (1) are made of the same material and are used to support the cams as they actuate the slides. Clearance holes must be provided to accommodate the studs attached to the slides. The springs (13) that surround the studs (stripper bolt, 14) rest against the blocks (1), providing the necessary pressure to pull back the slides.

The center post (8) is made of soft machine steel and has two hardened steel die buttons that are pressed into the shouldered holes as shown. The center hole going through the die shoe is a clearance hole for the slugs. In this particular die the center post is made longer than necessary in view of a possible change over to a longer part. This necessitates the use of filler blocks (2) to build up the slide units to the proper position. Ordinarily the slide would ride directly on the die shoe.

The perforators (5) are made of hardened tool steel mounted in the correct location relative to the die buttons. Their end support and locking is accomplished by set screws.

The cams (3) are made of hardened machine steel shaped to the proper size and contour as needed. They are of the base type of construction to give them greater strength and to facilitate easier mounting. The hold down pad (7) is soft cold drawn steel actuated by springs (12) and held in position by shoulder screws. The timing or movement of the pad is such that it contacts the part, holding it securely before any action of the die takes place and releasing the part after the punches are withdrawn.

The entire unit is mounted on a standard die set by means of screws and dowel pins. In some cases a bumper or setting block is mounted on the rear of the die shoe and is of such height to control the depth of entry of the perforators into the die buttons.

Estimate

MACHINING AND GRINDING

Column A—for time values see Table, Fig. 6

	Machining hr.	Grinding hr.
HEEL—Det. 1—1½" x 1½" x 4⅝" CRS (70%) 2 required	.8	1.0
FILLER BLOCK—Det. 2—⅞" x 4½" x 5" CRS (70%) 2 required	1.0	.6
PUNCH (CAM)—Det. 3—3" x 3" x 3½" CRS (70%) 2 required	1.0	1.2
SLIDE—Det. 4—1½" x 3" x 3¼" MS (70%) 2 required	.4	.6
STRIPPER (HOLD DOWN PAD)—Det. 7—½" x 3" x 3⅛" CRS (70%) 1 required	.4	.4
DIE HOLDER (CENTER POST)—Det. 8—3½" dia. x 3" CRS = 3½" x 3½" x 3" CRS (70%)	.5	.3
GIB—Det. 9—¾" x 1" x 3¼" CRS (70%) 4 required	1.2	2.0
	5.3	6.1

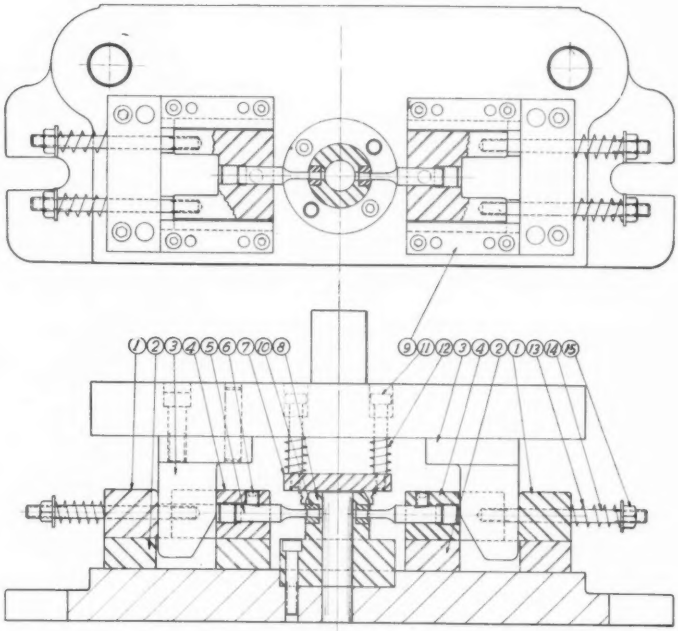
TOTAL Column A ..... 11.4 hrs.

DRILLING ALL HOLES EXCEPT FOR PERFORATORS AND PILOTS

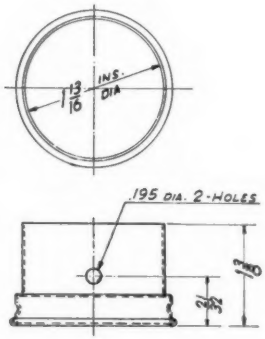
Column B—for time values see Table, Fig. 7

HEEL—Det. 1—2 screws, 2 dowels and 2 holes for spring return (.7 hr. each)	1.4 hr.
FILLER BLOCK—Det. 2—6 screws, 6 dowels, 2 required	2.6
PUNCH—Det. 3—4 screws, 2 required	1.0
SLIDE—Det. 4—drill and tap for adjustment and for lock screw (Det. 6) 2 required. Also for SOC. HD. SCR.	.8
STRIPPER—Det. 7—4 screws	.5
DIE HOLDER—Det. 8—2 screws, 2 dowels	.5
GIB (SLIDE GUIDE)—Det. 9—2 screws, 2 dowels, 4 required	2.0
PUNCH HOLDER—2 x .4 for Punches, .4 for stripper	1.3
DIE SHOE—4 screws, 2 dowels to mount slide, heel and slide guides. 2 sides	1.4
MOUNT DIE—2 screws, 2 dowels	.4

Plan View of Die



Section on Center Line of Die Assembly



Hopper-Screwed Base Shell, Material .015" CRS

MATERIAL LIST			
Det.	Req.	SIZE & MATERIAL	Remarks
1	2	1½" x 1½" x 4⅝" HEELS CRS	Pk. Hdn. & Gr.
2	2	⅜" x 4½" x 5" FILLER BLOCKS CRS	
3	2	3" x 3" x 3½" PUNCHES (CAM) CRS	Pk. Hdn. & Gr.
4	2	1½" x 3" x 3¼" SLIDES MS	Pk. Hdn. & Gr.
5	2	PERFORATORS	
6	2	LOCK SCREWS	
7	1	½" x 3" x 3⅛" STRIPPER (HOLD DOWN PAD) CRS	
8	1	3½" DIA. x 3" DIE HOLDER (CENTER POST) CRS	
9	4	¾" x 1" x 3¼" GIBS CRS	Pk. Hdn. & Gr.
10	2	BUSHINGS DR. RD.	Hdn. & Gr.
11	2	⅜" DIA. x 2" STRIPPER BOLTS	
12	2	HOLD DOWN PAD SPRINGS	
13	4	STRIPPER SPRINGS	
14	4	⅜" DIA. x 5" STRIPPER BOLTS (STUDS) CRS	
15	4	⅜"–16 HX. NUTS	

Fig. 50. Side or Cam Action Piercing Die, Designed by E. Taylor, Courtesy: Federal Tool Corp., Chicago.

SPRING HOLES—Fig. 8-4 required, .5 hr. each 2.0
HOLES FOR SPRING RETURN IN SLIDE—2 each .. .6

TOTAL Column B .....14.5 hrs.

units each (no inspection) 2 required ..... .8 hr.
PUNCH—Det. 3—2 required ... 1.6
SLIDE—Det. 4—2 required 6
DIE HOLDER—Det. 8—.2 hr. for center hole, .2 hr. for bushing hole 4

Inspection

PUNCH & SLIDE—working parts only 3.3
DIE HOLDER—Det. 8. Esti-

(Continued on Page 30)

DIE WORK ESTIMATING SHEET

	A	B	C	D	E	F
Det. 1 HEEL	.8 1.0	1.4		1.8		1.0
Det. 2 FILLER BLOCK	1.0 .6	2.6	.8	2.8		1.0
Det. 3 PUNCH (CAM)	1.0 1.2	1.0	1.6	9.8 2.2		2.0
Det. 4 SLIDE	.4 .6	.8	.6	2.2		2.0 1.0
Det. 7 STRIPPER	.4 .4	.5				.5
Det. 8 DIE HOLDER	.5 .3	.5	.4 .6	2.0		
Det. 9 GIBS	1.2 2.0	2.0				
PUNCH HOLDER		1.3				
DIE SHOE		1.4				
MOUNT DIE		.4				2.5
SPRING HOLES		2.0				
SPRING RETURN HOLES IN SLIDE		.6				
INSPECTION—PUNCH & SLIDE			3.3			
Det. 5 PERFORATORS					1.4	1.0
Det. 10 BUSHINGS					1.0	1.0
HOLES IN DIE					1.8	
CLEARANCE HOLE					.6	
STUDS FOR SPRINGS					.8	
PINS (TYPE 2)					.8	
TRYOUT						4.0
	11.4	14.5	7.3	20.8	6.4	16.0

Total 76.4 hrs.

Fig. 51

LAYOUT AND INSPECTION
Column C—for contour time values see Tables, Figs. 9, 10, 11, 12

Layout

FILLER BLOCKS—Det. 2—4

Methods for Accurate Locating of Work

(Cont'd from July Issue)

By E. G. Marshall

Assistant Superintendent

Pittsburgh Screw and Bolt Corp.

Prebble Avenue Plant

FIG. 10 shows a very accurate locating method if made and used correctly. B is the main base or body of the jig, C is a mild steel spacer to raise the locating point to the correct height on the work. D is a cold rolled steel block used as a nut for the clamping screw E, which moves the locator in and out or against and away from the work. The screw is held in contact with the locator by the pin F. G is the locator which is hardened and ground, with its working end shaped to fit the work. The opposite end is attached to the screw E. I and L are the right and left hand guide gibs respectively. J is the base plate over which the locator moves; this should be made of tool steel and hardened and ground. I and L are also made of tool steel and hardened, therefore a soft bushing M has to be used. Because tool steel distorts when hardened, the dowel pin holes may not match after hardening. To overcome this difficulty, a large hole is drilled in the bottom plate before the hardening and a soft steel plug riveted in. After hardening, the hole can be transferred from the gib through the soft plug and through the block C. The top face of J can be ground as necessary because of wear, and a shim fitted underneath to compensate for the grinding. The bottoms of the gibs can be ground to take up wear. Also the bottom of one

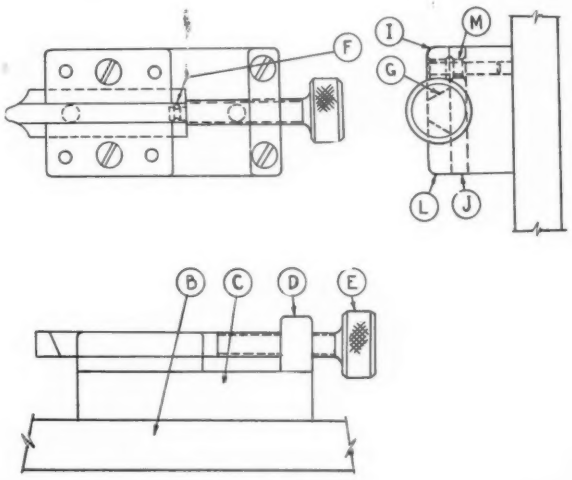


Fig. 10

can be ground and a shim placed under it to move the locator sideways.

Locating Mechanism for Assembling Detent, Ratchet

Fig. 11 is the locating mechanism for assemblying a detent and ratchet of an adding machine and to drill the dowel pin holes and drive the pins. The lid would have to be hinged to get it out of the way to drive the pins. A is the base or the body of the jig. Q is the stud to center and support the work and locate its height from the base of the jig. B is the work piece with the detent teeth. C is the ratchet to be pinned to the detent. In some cases the work is countersunk on each side and the pins riveted over to hold the parts together. D is a clamp to hold the work down on the locating stud. The detent is located by the swinging arm E. The angles R are ground to match the angles on the detent when in contact with it. The end is supported to the correct distance from the base by the hardened stud F. The stud thus holding up the working end permits a looser fit on the pivot stud. The stud G is made of tool steel, hardened and ground. The cap H held on by the screw I fastens the arm to the stud and also holds and ad-

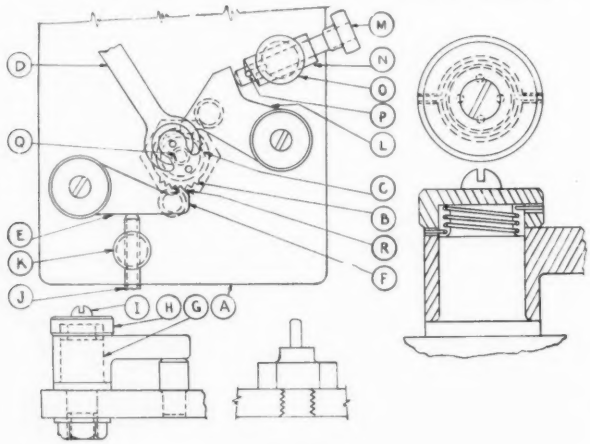


Fig. 11

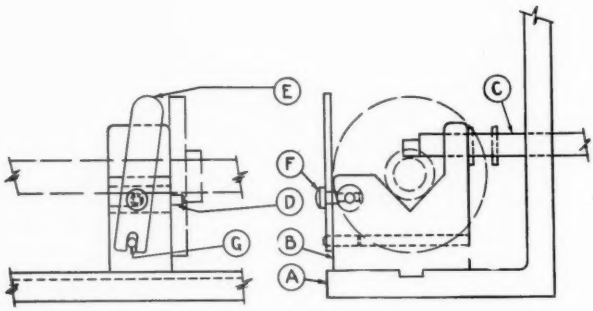


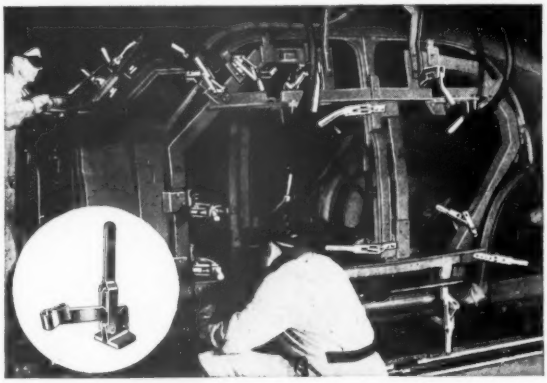
Fig. 12

Methods for Accurate Locating of Work

justs the spring which is needed to keep the arm away from the work when it is not being used to locate.

The cold rolled stud K is a drive-fit into the base. The screw J he is made of cold rolled steel, cyanide hardened, and is required to maintain the locating arm in a firm contact with the detent. The swinging arm L locates the ratchet. When this arm L is moved in slowly to contact the ratchet, the operator should use his other hand to turn the face of the ratchet tooth against the arm. This arm L has the same type pivot stud as the other arm E. The cold rolled stud O is a drive-fit in the base. Into it is driven the hardened tool steel bushing N which guides the clamping pin. This clamping pin M has a cross pin P which fits into the slot in the bushing N. When the pin is drawn back into the slot, the arm can swing away from the ratchet. When the pin M is pushed in, the arm locates the ratchet and when the pin reaches the end of the bushing it is turned to one side out of the groove and it locks the arm. The cross pin, the pin M and the bushing should be made of tool steel and hardened. Properly made, this method of locating is very accurate.

Fig. 12 is a drawing of a method to clamp and locate a cam on a shaft. The cam is hand reamed to be a snug fit on the shaft. It is then placed in the jig. The shaft is clamped down in the Vee block and the locating pin brings the cam into correct position, while the hub is drilled and taper reamed and a pin driven in. A is the body of the jig. B is the combined Vee block and locating block. To maintain any degree of accuracy, it would have to be made of tool steel and hardened and ground. C is the eccentric pin used to clamp the shaft in the Vee block. It is made of drill rod and hardened. The working end is supported by a bearing in the block B and the other end is supported by a bearing in the body of the jig. Two taper pins in the eccentric pin prevent it moving too far in or out in either direction. The pin D locates the cam. It can be moved in or out by using the hand lever E to engage or disengage the cam. The stud F is used to attach the arm to the pin. The bottom end of the arm is located by the pin G.



DE-STA-CO

Quick Acting Toggle Clamps

for holding parts in production:—

AUTOMOTIVE
AIRCRAFT
REFRIGERATION
ASSEMBLY
DRILLING
WELDING
ARC WELDING
SPOT WELDING
SOLDERING
MACHINING

Send for Bulletin No. 40

DETROIT STAMPING CO.
Established Over 25 Years
344 Midland Ave. - - - DETROIT, MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

PLASTIC MOLD DESIGNING

By GORDON B. THAYER

Plastic Design Engineer
General Industries Company

Article VI of a Series

In this installment Mr. Thayer describes the design of the first of a series of injection type molds. The injection type mold is of particular interest to the tool rooms and die shops because so many of the newer plastic materials are particularly well adapted to injection molding. With the rapidly expanding market for plastic products and the use of modern press equipment, the tool room and die shop industry not only is designing and building an increasing number of molds, but showing a real interest in the production of molded products.

—*The Editor.*

The Design of an Ejector-Pin Type of Mold

AN injection type mold is a mold into which a plastic material is introduced from an exterior heating, or plasticizing, cylinder. Such a mold operates at a constant temperature; cool, or slightly warm. Injection molds are principally used for thermoplastic materials, which set to shape on cooling. The essential parts are the cavities, cavity retainer plates, cavity backing plates, ejector mechanism, adaptor plates to fit the press, and the system of sprue, runners and gates for introducing the material into the cavities.

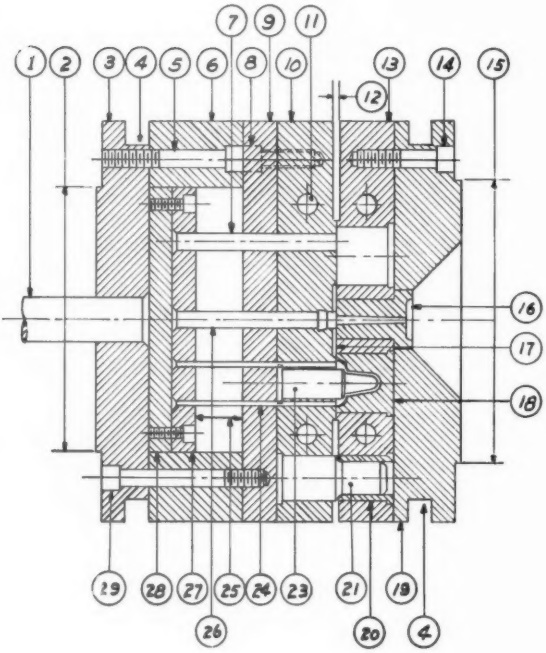
The mold shown in Fig. 10 is a simple ejector-pin style mold for molding the ink bottle cap shown in Fig. 11. Two views of the mold are shown, one a sectional elevation, and the other a view facing the injection half. The parting line is shown (detail 12). The cavities are arranged in a circle, and thus are equidistant from the sprue at the center.

Six cavity blocks (detail 18) are hobbed from mold steel, of low carbon content. After hobbing, they are machined on diameter and length, with grinding stock allowed. They are then carburized, hardened, ground and polished. The core blocks (detail 23) are turned from alloy mold steel, and are hardened, ground, and polished. Both cavity and core blocks are shouldered at the back end to be held in the retainer plates. Polishing is confined to the molding portions, and grinding is done only to the fitting portions. All six cores are ground to the same length, and the cavity blocks are treated likewise. The cavity blocks are doweled or peened at the back to keep them from turning. This is to keep the gate in line with the runner. The gate is ground in the cavity block after assembly, and is made large enough by trial to allow the cavity to fill properly. In this case, the cores do not have to be doweled as they are round, and turning in the retainer plate will do no harm.

Retainer Plates

The cavity retainer plate (detail 13) is made of alloy mold steel, but may be left soft to avoid possibility of distortion in hardening. Water lines (detail 11)

Fig. 10. Right, sectional elevation of ejector-pin type injection mold. Below is a view facing the injection half.



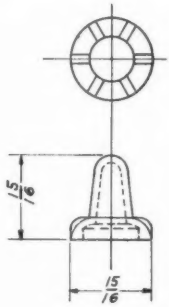
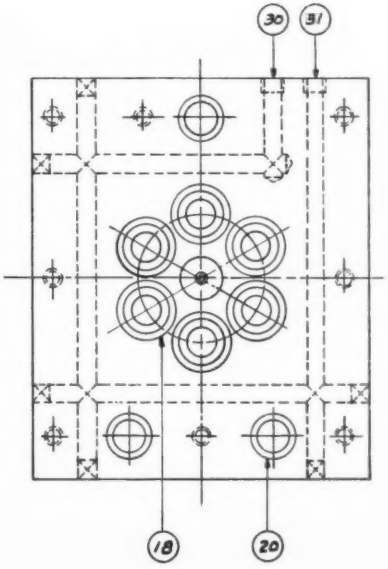


Fig. 11. The product, an ink bottle cap.



Principal Parts

1. Ejector rod
2. Mounting boss—ejection half
3. Adaptor plate—ejection half
6. Ejector box spacer
7. Ejector return pin
9. Backing plate
10. Core retainer plate
13. Cavity retainer plate
15. Mounting boss—injection half
16. Sprue bushing
17. Runner
18. Cavity block
19. Adaptor plate—injection half
20. Guide pin bushing
21. Guide pin
23. Core block
24. Ejector pin
26. Sprue ejector pin
27. Pin retainer plate
28. Pin assembly plate
30. Water inlet
31. Water outlet

are drilled, and the inlet and outlet (details 30 and 31) are tapped for pipe fittings. The plate is tapped for 8 retainer screws (detail 14). The guide pin bushings (detail 20) are mounted in this plate. They are hardened and ground, with a retaining shoulder at the back. The cavity retainer plate is ground to the same thickness as the cavity blocks, and then a relief (detail 12) is turned outside the required area for closing off the runners and landing the ejector return pins (detail 7). The land which is left is as small in area as possible to increase the unit pressure holding the mold closed. The alloy steel plate, though unhardened, is tough enough to withstand some battering and crushing as the mold closes. A hole is bored in the center of the cavity retainer plate to receive the sprue bushing.

The core retainer plate (detail 10) is made of alloy mold steel and left soft as is its mating plate. It is also drilled for water lines in the same relative position. It is tapped for 4 retainer screws (detail 8), which hold it to the backing plate (detail 9). Clearance holes are provided for three ejector return pins (detail 7). The ejector pins (detail 24) are fitted for a short distance back from the molding edge of the plate, and then the holes are opened a little to make clearance and to make the lapping easier. The three guide pins (detail 21) are mounted in this plate. They are hardened and ground, with a retaining shoulder at the back. Six runners (detail 17) are cut in the core retainer plate, and the hole for the cold slug and sprue ejector pin (detail 26) is bored in the center of the plate. This hole is undercut slightly to hold the cold slug in place until the mold opens, and thus pulls out the sprue slug. The cold slug is just that—the first material to enter the mold. It is liable to be too cold to flow or weld properly, so it is allowed to bypass into the space provided, and the hotter material following is in better condition to mold. The same relief is provided on the core retainer plate as on the mating plate. It is also ground to the proper height.

The two retainer plates are bored together in order to assure proper alignment of cavities and cores. Holes for the guide pin bushings are also bored while the plates are clamped together.

Backing Plates

Backing plates are used to hold the cavity and core blocks in the retainer plates. They also hold the guide pins and bushings. In this mold, one special backing plate is provided (detail 9) and the cavities are backed up by the injection adaptor plate. These plates may be hardened, if the mold is large, or if the projected cavity area is large. This is to prevent bending and to prevent the blocks from sinking under the molding pressure. In less severe cases, the backing plates may be made of alloy steel and left soft. For light service, they may be made of cold rolled or machine steel. In any event, they should be ground to make a good fit. If the core retainer backing plate is to be hardened, holes for ejector pins and retaining screws must be finished before hardening. Plain holes should have sufficient clearance for free operation of the pins. Tapped holes can be provided for by clearance in the drilled holes in the mating parts. Good workmanship calls for fairly good fit even in clearance holes, although the same accuracy is not required in the cavity proper. It should not be necessary to increase the size and weight of a mold in order to provide a lot of extra clearance space for careless workmanship. This applies particularly to holes which come close to water lines.

Ejector Mechanism

The ejector mechanism consists of casting ejector pins, sprue ejector pin, or pins, ejector return pins, pin retainer plate, pin assembly plate, ejector box, and ejector rod.

Ejector pins are made of drill rod, upset at the retaining end and preferably straight, with no turning required. They should be hardened. In this mold, 3 ejector pins (detail 24) are used for each casting. One sprue ejector pin (detail 26) is used. Three ejector return pins (detail 7) are used. They push the ejector assembly back to the position as shown when the mold closes.

The pins are held in the retainer plate (detail 27) which is screwed to the assembly plate (detail 28). These plates should be flat, but not necessarily

(Continued on Page 41)

Flame Hardening Process Popular; Plant Expands

HEAT treating with the oxyacetylene flame is a method which "imparts a hardened layer to the surface of the material without altering its chemical composition." One of its greatest values is evidenced in the hardening of only those specific portions of an object which require hardening, thus eliminating the wasteful method of hardening 100% of a large body when only 10% requires it. This process permits the treating of exact sections or surfaces of a product and it is accomplished with no measurable distortion.

The Lakeside Steel Improvement Company of Cleveland has used the flame hardening process since 1934 and in the intervening period has developed its own types of machines for various applications of the process, some of which are entirely new. The flame hardening of such products as pins, rolls, shafts, axles, wheels, sheaves, gears, dies and rails has become such an important part of Lakeside's volume as to require a new building 40 by 200 feet. Also, other departments requiring additional space have made necessary an addition to existing buildings of 40 by 60 feet.

The company's research in the flame hardening field enables it to guarantee that each part treated on its rotary flame hardening machine will be uniform with every other part.

The Lakeside Steel Improvement Company specializes also in the heat treating and straightening of bar stock—all sizes and lengths. In addition to the heat treating of production parts in any quantities, the company has a special department for treating tool and die, jig, fixture and machine parts, also for the annealing and strain-relieving of welded structures. Among its other processes are Nitriding, Chapmanizing, Aerocasing, Carburizing and Cyaniding.

For information about flame hardening, write The Lakeside Steel Improvement Company, 5418 Lakeside Ave., Cleveland, O., or telephone HEnderson 9100 day or night.

O. K. for SIZE? *You bet!*

HE'S USING

STARRETT VERNIERS

Look at the complete line of vernier calipers and gages illustrated in Starrett Catalog No. 26 DM and you'll know why expert tool and die makers go for them every time. Write for a copy.

THE L. S. STARRETT CO.
ATHOL, MASSACHUSETTS, U. S. A.

Standardize on
STARRETT TOOLS
BUY THROUGH YOUR DISTRIBUTOR

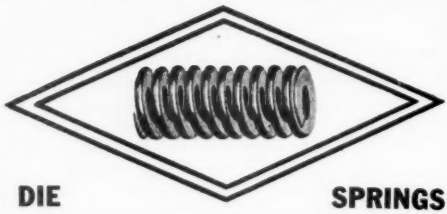
When you order or write about products described in TDM PROGRESS please mention the publication.

Now Your

PRECISION-STANDARD DIE SPRINGS

are Packed in Cartons with this Label

PRECISION STANDARD



DIE SPRINGS

For many years *Precision-Standard* P.S *Die Springs* have been designed and manufactured to meet the most exacting requirements of die, tool, jig and fixture builders.

Precision-Standard Die Springs have continuously assured stamping and forging manufacturers and all die users of longer spring fatigue life and trouble-free die operation.

They have been approved and adopted as standard by leading automotive manufacturers.

All *Precision-Standard Die Springs* are now available in cartons to enable you to select sizes quickly and to maintain stocks complete and orderly.

Standardize on P.S Die Springs

Send for complete Catalog

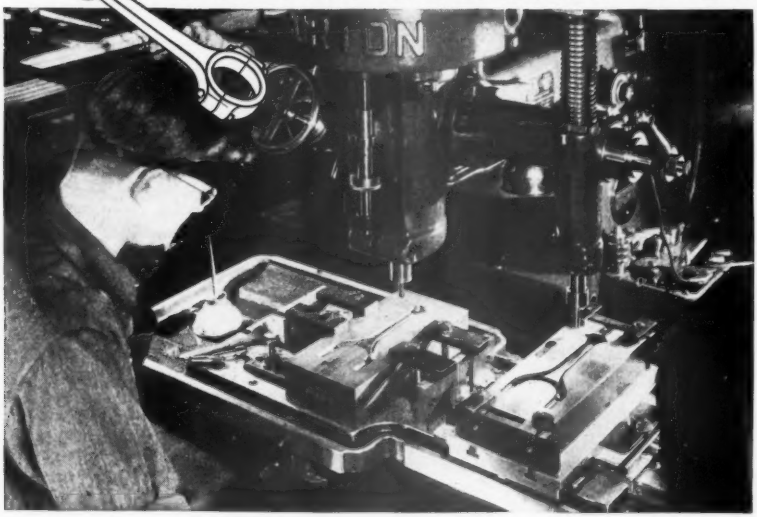
PRECISION SPRING CORPORATION

15400 WOODROW WILSON AVE. DETROIT, MICHIGAN

Coiled and Flat Springs for Every Purpose

When you order or write about products described in TDM PROGRESS please mention the publication.

BETTER FORGING DIES



With GORTON DUPLICATORS

The illustration shows a Gorton Duplicator working on a connecting rod coin forging die. The producers of this die had tried several methods of quantity reproduction to close limits and found that the required speed, accuracy, and economy were possible only with Gorton equipment. Send for bulletin No. 1319-B.

George Gorton Machine Co.
Engineering Research Dept.
1119 13th St., Racine, Wis.

Please send me bulletin No. 1319-B with complete information on Gorton Duplicators.

Name.....

Position.....

Firm Name.....

Street.....

City.....

State.....

Mail Coupon Today ➡

TRADE MARK
GORTON
RACINE, WIS., U.S.A.

GEORGE GORTON MACHINE CO.
1119 13TH STREET, RACINE, WISCONSIN, U. S. A.

When you order or write about products described in TDM PROGRESS please mention the publication.

The Tool and Die Shop and National Defense

Of the 252 items listed as "critical items" by the War Department, over 200 are those which require tool room and die shop facilities. The National Defense program begins in the tool room and die shop.

* * *

The new Garand (M-1) semi-automatic rifle requires over 2000 gages in manufacture. This rifle weighs only half a pound more than the old Springfield (Model 1903), has 75 parts to the Springfield's 95, yet has a fire power two and a half times the older weapon.

* * *

The first tooling for the manufacture of the Garand rifle at the Springfield Arsenal took approximately two years. The second tooling, that now in process in the Winchester Arms plant, is expected to take less than 8 months and production is expected to begin in October.

* * *

There are 7300 principal items of equipment and supply for use of our soldiers, of which slightly over 4000 have been standardized and for which full specifications are ready for industry.

* * *

Under the Industrial Mobilization Plan (1939) and the schedule of exemptions proposed for inclusion in the Burke-Wadsworth Bill, tool and die workers would be exempt from military duty. Although not definitely stated, this probably would include apprentices.

* * *

The secret of mass production, according to C. E. Wilson, acting president of General Motors, "is really an interchangeability of parts and a flow of material . . . it is a balancing of the equipment in your plant and a flow of parts that are interchangeable."

* * *

The most commonly used precision limit in the tool room, a "tenth", (.0001") is approximately twice the thickness of the average human hair. When a tool maker works to less than half a tenth (.00005") he is literally "splitting hairs".

Die Supply Increases Facilities for Die Makers

DIE Supply Co., Cleveland, O., recently completed their new assembly facilities in their enlarged stock room for assembling and testing of die sets, according to J. R. Fitzsimmons, president of the Company. A full line of Producto Master and Standard Die Sets are carried. Die sets are received completely machined, die shoes and punch holders are line bored in a jig and all parts are interchangeable. Pins and bushings are assembled on a 40-Ton Hydraulic Press. Bushings are then properly lapped to make a precision fit on the pins. All sets are carefully inspected before they leave the department.

A full line of screws—socket head cap, hollow set, square head set and transfer, stripper bolts, dowel pins, guide pins and bushings are carried in stock for immediate shipment. Precision-Standard die springs, Hovis standardized punches, button dies and retainers and Cerromatrix low temperature-melting metal alloys are carried.

Mr. Fitzsimmons, a veteran in the die building and die accessory field, is widely known throughout the industry. Two sons, Warren H. and Joseph T., are associated with him in the business. Mr. Fitzsimmons reports that the progressive assembly permits nearly all orders to be shipped the day they are received.

A copy of complete Die Set and Accessory Catalog will be sent promptly on request. Address Die Supply Co., 1390 E. 30th St., Cleveland, O.

H. K. Metalcraft Manufacturing Corporation Moves

THE H. K. Metalcraft Manufacturing Corporation announces the removal to their new location at 444 West 31 St., New York City, where they will have more space, better loading facilities and a more economically arranged plant which will mean a better service at lower prices.

This company, which has just celebrated its 18th birthday, is equipped with presses of capacities up to 50 tons and a skilled designing department so that they offer a real service for products of pressed metal parts.

Included in their specialties are washers, spacers, metal checks, chain ladders and a wide range of metal stampings.

For a new folder, "Money-Saving Products and Services," write H. K. Metalcraft Mfg. Corp., 444 W. 31 St., New York, N. Y.

Elastic Stop Nuts Offer Many Advantages

THE Elastic Stop Nut, the nut with the resilient non-metallic locking collar, is completely self-contained, it fits all standard bolts from the smallest to the largest, eliminates axial play and maintains constant pressure on the load carrying sides of the thread.

An Elastic Stop Nut, with the same threaded height as that of an ordinary nut of corresponding size, acts in every way as an ordinary nut until its locking collar reaches the end of the bolt. The tough resilient locking collar, of bone-like cotton cellulose fibre, chemically hardened and impervious to oil, water or ordinary solvents, is not threaded. When an Elastic Stop Nut reaches the point where its locking collar presses

(Continued on Page 30)

DIES
JIGS
FIXTURES
GAGES

SPECIAL MACHINES

♦♦♦

Precision and
General Machine Work

♦♦♦

Experimental Work
Boring Mill
Jig Boring and
Planer Work

♦♦♦

DELIVERY TO MEET SPECIAL DEMANDS

♦♦♦

Phone GArfield 2060

STAR MACHINE
& TOOL COMPANY
9320 WOODLAND AVE.
CLEVELAND, OHIO

Detroit Representative: J. O. Stephenson
CAdillac 7261, Detroit, Mich.

When you order or write about products described in TDM PROGRESS please mention the publication.

Elastic Stop Nuts

(Continued from Page 29)

against the end of the bolt, the nut is forced outward, its outer thread flanks are brought into pressure-contact with the inner-thread flanks of the bolt. Friction is established between the threads of nut and bolt throughout their length, eliminating all thread play. As long as this friction is maintained, no amount of vibration or hard service can cause the nut to move.

As the nut is wrenched farther, the bolt threads work through the working collar, not cutting but impressing a thread in it. This creates a moisture-tight seal around the bolt, providing additional braking effort to resist any turning of the nut. This likewise maintains the constant friction between the load carrying thread flanks, eliminating thread play. The locking collar, being of resilient non-metallic non-fatiguing material, acts as a vibration damper.

Elastic Stop Nuts are approved by the Department of Commerce for licensed aircraft, by many other government departments and by the test departments of practically every major manufacturing company.

A new folder "Elastic Stop Self-Locking Nuts" is available for distribution. Write Elastic Stop Nut Corporation, 2334 Vauxhall Road, Union, N. J.

New Die Sets Adaptable for Circular or Square Dies

DANLY Machine Specialties, Inc. reports peak business in the square type Precision Die Sets, preferred by die makers because of their adaptability to either square or circular dies. Parts of Danly Die Sets are machined to precision limits, assembled by precision machinery and inspected to precision standards assuring precision alignment, parallelism. Dies mounted in Danly Precision Die Sets go together accurately on the bench—close accurately on the press—and remain accurate for runs high in the millions.

Phone your nearest Danly district office (there are 8, with stocks) or write Danly Machine Specialties, Inc., 2121 S. 52nd St., Chicago, Ill.

Die Designing and Estimating

(Continued from Page 18)

mate for bushing hole	.6
TOTAL Column C	7.3 hrs.
MACHINING, FINISHING AND FITTING DIE PARTS	
Column D—use contour units as established for Column C, also Drawings and Tables, Figs. 13-20	
HEEL—Det. 1—Radius, .2 hr. per inch.* 2 required	1.8 hrs.
FILLER BLOCK—Det. 2—4 units, size 4" (70%) CRS Fig. 14. No Finishing	2.8
PUNCH—Det. 3—4 units, 5 sq. inches x 3" deep (70%) CRS See Material Removal. Fig. 19, 2 required	9.8
2 units, 3 sq. inches x 1" deep (70%) CRS , 4 required	2.2
SLIDE—Det. 4—3 units, 1½ sq. inches x 1½" deep (70%), 2 required	2.2
TURN DIE HOLDER to size ..	2.0
TOTAL Column D	20.8 hrs.
PERFORATORS, PILOTS AND THEIR CORRESPONDING HOLES	
Column E—see Table and Drawings, Figs. 21-26	
PERFORATOR—Det. 5—Type 2, .7 hr. each, Fig. 22, 2 required	1.4 hrs.
BUSHING—Det. 10—Type 1 perforator, 2 required	1.0
HOLES IN DIE	1.8
CLEARANCE HOLE for slug in die and die shoe—.2 hr. each + .1 hr. for setup	.6
STUDS FOR SPRINGS—4 required	.8
TYPE II PINS—4 required, Fig. 27	.8
TOTAL Column E	6.4 hrs.
ASSEMBLY, TRYOUT, DEVELOPMENT	
Column F—see Table, Fig. 28 and accompanying text	
MOUNTING 2 HEELS—Det. 1 —to Die Shoe	1.0 hr.

*Approximate time which can usually be taken. The heels are 4⅝" long (4½"), so that each would take .2 x 4½" or .9 hr. each

When you order or write about products described in TDM PROGRESS please mention the publication.

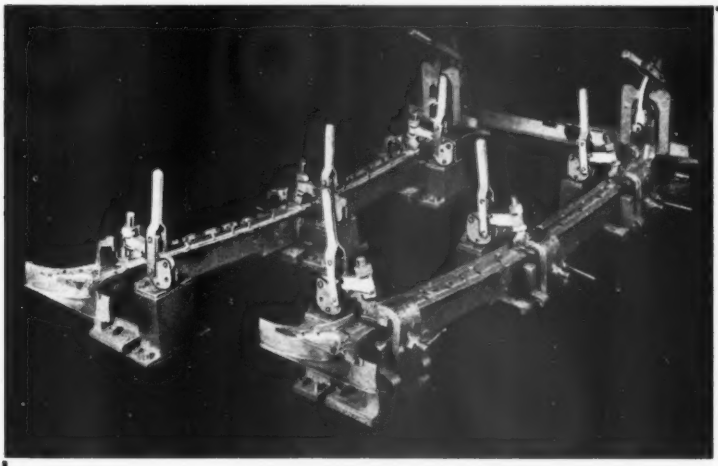
MOUNTING 2 FILLER BLOCKS—Det. 2—to Die Shoe	1.0
MOUNTING 2 SLIDES—Det. 4	2.0
MOUNTING 4 SLIDE GUIDES	1.0
MOUNTING 2 PUNCHES—Det. 3—	2.0
MOUNTING STRIPPER—Det. 7—	.5
SINK AND MOUNT DIE	2.5
ASSEMBLING 2 BUSHINGS —Det. 10	1.0
MOUNTING 2 PERFORATORS —Det. 5—	1.0
TRYOUT—This type of die takes considerable time to line up properly, therefore we allow	4.0
TOTAL Column F	16.0
Estimated hours of labor required	76.4 hrs.

Carpenter Steel Issues "Spotlighting" Booklet

THE Carpenter Steel Company has issued a new booklet "Spotlighting, a new Hidden Way to Get More from your Present Production Set-Up," which presents a very interesting analysis of the four factors of successful tool making and gives case records of the advantages of using accurately graded steels by the Carpenter Matched Set Method. The Matched Set Method is an organized approach to the problem of correct tool steel selection which takes all the factors affecting the ultimate economy of tools into account. An automatic pre-analysis which considers the design of the tool, past experience with similar tools, length of the run, material to be worked, type of operation and other factors indicates the exact steel required for a given job. By following ranges of properties on a tool steel map the right combination indicated can be easily chosen from the nine Matched Tool Steels.

An explanation of the use of the Matched Set Method is given, illustrated by actual shop examples.

A copy of "Spotlighting" is available from your Carpenter representative or the Carpenter Steel Company, Reading, Pa.



KNU-VISE

Knu-Vise Toggle Clamps — The Fastest and Most Inexpensive Method of Clamping Parts in Dies, Jigs, and Fixtures.

Write also for information on recently introduced Knu-Kam-Klamp—designed especially for clamping rough castings, forgings, etc. Withstands vibration, hard wear and rough usage.

KNU-VISE INC. 16841 HAMILTON AVE. HIGHLAND PARK, MICH.

When you order or write about products described in TDM PROGRESS please mention the publication.

Schmidt Company To License Use of Cam Compensator

THE R. J. Schmidt Company announces a plan to license a selected number of shops or plants in the principal industrial areas throughout the country for the use of the Schmidt Cam Compensator. Individually negotiated agreements to cover specific areas or types of industries to be served will be made, according to R. C. Knowles, secretary and treasurer of the company. Because one trained man with the Cam Compensator can turn out master cams at a fraction of the time required by present methods, the number of licenses granted will be restricted to tool rooms and die shops and to companies that are established sources of supply for specific industries or specialized fields.

The Cam Compensator is the first practical device for the rapid, accurate and economical cutting of all sizes and types of cams. For the first time it is possible to cut master cams direct from a blue print. No secondary charts, no experimental cams need to be made. Development work and human errors are eliminated. Designed for use on a standard milling machine, the Cam Compensator quickly and accurately translates a blue print into a cam. Only minor finishing operations need to be made before the cam is ready for service. The Cam Compensator can also be used for the rapid duplication of a master cam. The time saved usually means that a master and a number of duplicates can be made with the use of the Cam Compensator in less time than a master cam alone can be made by other methods.

Getting Salesmen's Co-operation
Tying in Advertising with Selling
Getting out into the field
Copy Testing
DIRECT MAIL
Market Information
Layout, Copy and Illustration
Contributing to the solution of general company problems
Readership of Publications
Measuring Results
What's YOUR Problem?
No doubt several of your problems are among these . . . to be threshed out at the 18th Annual Conference and Exposition of the National Industrial Advertisers Association.
All Industrial Marketing Executives Are Invited
ALLOCATION OF BUDGETS
Programs that management will approve
NIAA
1940 INDUSTRIAL ADVERTISING CONFERENCE
DETROIT HOTEL STATLER SEPTEMBER 18, 19, 20

At present, when time is such an urgent factor in precision work, the Cam Compensator offers important advantages. The cutting and development of master cams has always been a slow, laborious and costly job. The ability to cut cams directly and accurately saves critical shop time. There is no waste of man hours in experimentation or development. The saving in cost is very considerable. A licensee cannot only deliver satisfactory cams faster, but can underquote cams built by other shops and still maintain a good margin of profit.

The Cam Compensator is not an experiment. Now two

(Con't on Page 49)

When you order or write about products described in TDM PROGRESS please mention the publication.

New Atlantic India Rubber Catalog of Industrial Rubber Products

THE Atlantic India Rubber Works, Inc., offers users of rubber parts for both mechanical and manufacturing purposes a distinctly unusual service. The company has just issued Catalog T21 which illustrates and describes a wide variety of standardized Industrial Rubber Products including Grommets, Bushings, Bumpers, Balls, Gaskets, Cord Rings, Tubing, Vacuum Cups, Washers, Spring Rubber, Sheet Rubber, and Sponge Rubber. Every one of the hundreds of items and sizes that is described is carried in stock for immediate shipment, and in addition the Company has in its plant, molds and plates for thousands of other parts which are quickly adaptable to specific industrial needs.

As designers, engineers, and manufacturers for a period of twenty-one years, the company has acquired valuable experience in the development of new parts and ideas. The company's large stock ordinarily enables engineering and manufacturing departments to select standardized parts to suit their exact requirements, but when this is not possible, the company offers a service based upon individual needs which includes, also, the laboratory development of any special rubber compound.

Designers, Engineers, Superintendents and Purchasing Agents will find Catalog 21P of unusual value. Write Atlantic India Rubber Works, Inc., 1453 W. Van Buren St., Chicago, Ill., or send drawing or sample of part required.

Reeves Adds Vari-Speed Jr. to Speed Control Line

REEVES Pulley Company, Columbus, Indiana, announces the addition of the Reeves Vari-Speed Jr. to its complete line of variable speed control equipment. This new unit brings the advantages of variable speed control to low horse-power light duty equipment in an extremely low-cost unit.

The standard Vari-Speed Jr. comprises a disc assembly and adjustable motor base. The disc assembly consists of two cone-shaped discs (one stationary

(Continued on Next Page)

Builders of
Machines,
Dies, Jigs, Fixtures
Tools and Gages

Manufacturers of
Precision Parts and
Complete Products
to order

General Machine Work

*We invite you to check
our facilities,
our equipment,
workmanship
and experience.*

THE BUNELL MACHINE
& TOOL COMPANY

Telephone: PRospect 2681

1620 East 24th St. Cleveland, O.

When you order or write about products described in TDM PROGRESS please mention the publication.

Columbia
TOOL STEEL

STANDARDIZED STEELS

For users that desire interchangeable tool steels, we offer a full line of top quality products.

In addition we offer many special-purpose steels.

It pays to use Good Tool Steel.

COLUMBIA TOOL STEEL COMPANY
ARTHUR T. CLARAGE PRESIDENT
GENERAL OFFICE AND WORKS
810 EAST 14TH STREET • CHICAGO HEIGHTS, ILL.

Precision Tool Room Tapping
Save Time - Taps - Trouble

with
THE VIKING TAPPER
(Formerly the Master Tapper)

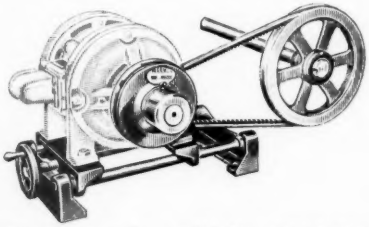
Capacity 1/4" to 7/8"
Send for Circular

The Viking Tool & Machine Corp.
6 Main St. Belleville, N. J.

Reeves Adds Vari-Speed Jr. Unit

(Continued from Page 33)

and one laterally adjustable), a self-adjusting tension spring, a spring adjusting nut and cover. This assembly is applied directly to the standard shaft extension of the motor and the motor is mounted on an adjustable base. A standard Section "A" or "B" V-belt is used.



By means of an adjusting handwheel, the motor is moved forward and back. When nearest to the driven sheave, the V-belt runs over the largest diameter on the discs and maximum speed is secured. Reversing the handwheel moves the motor away from the driven sheave. This causes the V-belt to run over the smaller diameter on the discs (the adjustable disc moving out to accommodate the belt). When the motor is farthest from the driven sheave, minimum speed is attained.

Speed variation is "infinite" within the limits of the unit—that is, a countless number of operating speeds is available without "steps" or "jumps"—and is accomplished while the machine is running and without interrupting production.

The Vari-Speed Jr. is built in six different sizes of disc assembly, for use with standard constant speed motors of from ⅛ to 1½ hp and provides speed control over a range of from 1¾:1 to 2¾:1, inclusive, depending upon the size, hp and speed of unit selected. Two sizes of motor bases are available, either may be used with any one of the six disc assemblies.

The unit is also available in a countershaft type for requirements of either unusual speed reduction or speed increase.

For literature or other specific information on the new Reeves Vari-Speed Jr. speed control unit, write Reeves Pulley Co., Columbus, Ind.

Buy With Confidence

ABRASIVE PAPER AND CLOTH
Carborundum Co., Niagara Falls, N. Y.
Norton Co., Worcester, Mass. (Behr-Manning Div.)

ASSEMBLING MACHINES—Automatic
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

BAR STOCK—Heat Treating
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, Ohio.

BARS—Rolled Composite
Forging and Casting Corp., Ferndale (Detroit), Michigan.

BOLTS—Stripper
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

BORING MILL—Cutters
Bokum Tool Co., Inc., 49 W. Hancock St., Detroit, Mich.

BUSHINGS—Die
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

BUSHINGS—Rubber
Atlantic India Rubber Works, Inc., 1453 W. Van Buren St., Chicago, Ill.

BUSHINGS—Drill Jig
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.

This directory of products lists for ready reference the names of manufacturers and dealers whose sales to Tool·Die·Machine PROGRESS readers have established them as dependable in every sense of the word. They merit your consideration.

Complete information about any product may be had upon request made to the firm listed or to us.

Your mention of Tool·Die·Machine PROGRESS will be appreciated.

CALIPERS
L. S. Starrett Co., Athol, Mass.
Lufkin Rule Co., Saginaw, Mich.

CAMS
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

CAM DEVELOPMENT
R. J. Schmidt Co., 227 Colonial Arcade, Cleveland, O.

CASTINGS—Air and Oil Hardening Tool Steel Cast to Shape
Forging and Casting Corp., The, Ferndale (Detroit), Mich.

CASTINGS— Nitri-Cast-Iron
Forging & Casting Corp., The, Ferndale (Detroit), Mich.

CHUCKS—Collet
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.

CLAMPS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.

CLAMPS—Toggle
Danly Machine Specialties, Inc., 2121 S. 52nd St., Chicago, Ill.
Detroit Stamping Co., 344 Midland Ave., Detroit, Mich.
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.

CLAMPS—Toolmakers
L. S. Starrett Co., Athol, Mass.

CONTOUR METAL-WORKING MACHINES
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.

COUNTERBORES
Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.

Complete Manufacturing Facilities

TOOLS, DIES — JIGS, FIXTURES, — GAUGES, JIG BORING
SPECIAL MACHINERY — METAL SPECIALTIES — DESIGN AND DEVELOPMENT

OVER 50,000 SQ. FT. FLOOR SPACE

PUNCH PRESSES
KINGSBURY DRILLING MACHINES
HIGH SPEED TAPPING MACHINES
MULTISLIDE

INJECTION MOULDING
SPRING WINDERS
HIGH SPEED BLANKING
SPOT WELDERS
CONVEYORS

Send prints or sample for prompt estimate

FEDERAL TOOL CORPORATION

400 North Leavitt Street - - - - Chicago, Illinois

When you order or write about products described in TDM PROGRESS please mention the publication.

CRANKSHAFTS—Heat Treated for Process
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.
CUTTERS—Die-sinking
Geo. Gorton Machine Co., 1119—13th St., Racine, Wisc.
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
CUTTER GRINDER
George Gorton Machine Co.,: 1119—13th St., Racine, Wisconsin.
Oliver Instrument Company, 1436 Maumee St., E., Adrian, Michigan.
Norton Company, Worcester, Mass.
CUTTERS—Milling
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.
Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.
CYLINDERS—Hydraulic
Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.
CYLINDERS—Pneumatic
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.
Tomkins-Johnson Co., 630 N. Mechanic St., Jackson, Mich.
DIAMOND STONES
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DIAMOND WHEELS
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DIE CASTING MACHINES
Phoenix Machine Co., The, 2711 Church Ave., Cleveland, Ohio.
DIE FILING MACHINES
Illinois Tool Works, 2503 N. Keeler Ave., Chicago, Ill.
DIE HANDLING TRUCKS
Hamilton Tool Co., 222 North B St., Hamilton, Ohio
DIE MAKERS SUPPLIES
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

DIE MAKING MACHINES
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.
Foley Mfg. Co., 59 Main St., N. E., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Mich.
DIE SECTIONS—Composite Steel
Forging and Casting Corp., Ferndale (Detroit), Michigan.
DIE SECTIONS—Forged
Ajax Steel and Forge Co., 205 Adair St., Detroit, Mich.
DIE SETS
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
DOWEL PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
DRESSING STICKS
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.
DRILLING MACHINES—Automatic
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.
DRILL JIG—Toggle Action
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.
DRILL JIG BUSHINGS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
DRILL POINTERS
Oliver Instrument Co., 1436 E. Maumee St., Adrian, Mich.
DRIVE UNITS—Motorized
Drive-All Mfg. Co., 3402 Conner Ave., Detroit, Mich.
DUPLICATOR MACHINES
Geo. Gorton Machine Co., 1119 13th St., Racine, Wisc.

ELEVATING TABLES—Portable
Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
END MILLS
The Tomkins-Johnson Co., 630 North Mechanic St., Jackson, Mich.
Putnam Tool Co., 2985 Charlevoix, Detroit, Mich.
EXTRACTOR—Broken Tap
The Walton Co., 58 Allyn St., Hartford, Conn.
FILES—Rotary
Hamilton Tool Co., The, 222 North B Street, Hamilton, Ohio.
Grobet File Co. of America, 3 Park Place, New York City, N. Y.
FILING MACHINES
Oliver Instrument Co., 1436 E. Maumee St., Adrian, Mich.
FILING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 Washington Ave., S., Minneapolis, Minn.
Grob Brothers, Grafton, Wis.
FLAME HARDENING
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, Ohio.
FORGINGS—General
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
FORGINGS—Water and Oil Hardening, High Speed, Special Alloy, Stainless and S. A. E. Steel
Forging and Casting Corp., Ferndale (Detroit), Michigan.
FURNACES—Tempering and Drawing
Despatch Oven Company, 600 S.E. Ninth St., Minneapolis, Minn.
GAGES—Center, Depth, Planer, Telescoping, Surface, etc.
The Lufkin Rule Co., Saginaw, Mich
L. S. Starrett Co., Athol, Mass.
GAGES—Combination Height and Depth
Continental Machines, Inc., 1303 S. Washington Ave., Minneapolis, Minn.
GAGES—Dial
L. S. Starrett Co., Athol, Mass.
GAGES—Spring Stop
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.

Send for Valuable Booklet

Forgings For All Industries
Rough Turned or Finished Complete

●

Composite Die Sections
Extrusion Tools
Crankshaft Forgings
Gear Forgings
Die Casting Dies

●

Rings, Discs, Blocks, Shafts, Hubs, Bars, and Special Shapes.
Tool Steel of all Makes

S.A.E. Specifications

STAINLESS & COPPER FORGINGS

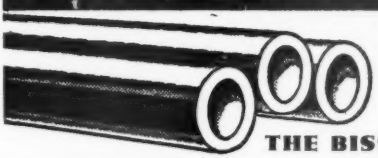
May We Serve You?

AJAX STEEL AND FORGE Co.

205 ADAIR STREET DETROIT, MICHIGAN

When you order or write about products described in TDM PROGRESS please mention the publication.

OIL HARDENING TOOL STEEL TUBING



Substantially reduces labor costs by eliminating the expensive procedure of drilling from the solid.

BISCO TOOL STEEL TUBING is a fine grade tool steel in tubular form available in sizes up to 14" diameter and 2" wall thickness; other sizes to your specification.

Tool Steels Alloy Steels Stainless Sheets and Bars

THE BISSETT STEEL COMPANY 947 E. 67th St., Cleveland, Ohio

GAGE BLOCKS
Ford Motor Co., Johansson Div., Dearborn, Mich.
GEARS—Special—14 to 96 D.P.—Made to order only
Gear Specialties, Inc., 2640 W. Medill Ave., Chicago, Ill.
GRINDER—Cylindrical
Norton Company, Worcester, Mass.
GRINDER—Hydraulic Feed
Gallmeyer & Livingston Co., 304 Straight Ave., S.W., Grand Rapids, Mich.
GRINDER—Portable
Dumore Company, Racine, Wis.
GRINDER—Surface
Gallmeyer & Livingston Co., 304 Straight Ave., S.W., Grand Rapids, Mich.
Norton Company, Worcester, Mass.
Builders Iron Foundry, Providence, R. I.
GRINDER—Precision for Contours
Boyar-Schultz Corp., 2112 Walnut Street, Chicago, Ill.
Koestlin Tool & Die Corp., 3601 Humboldt Ave., Detroit, Mich.
GRINDER—Universal
Norton Company, Worcester, Mass.
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDER TOOL
Norton Company, Worcester, Mass.
GRINDING MACHINES—Cutter
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING MACHINES—Drill
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING MACHINES—Tap
Oliver Instrument Co., 1436 Maumee St., E., Adrian, Michigan.
GRINDING & LAPPING—Precision
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
GRINDING WHEELS
Carborundum Company, The, Niagara Falls, New York.
Norton Company, Worcester, Mass.
GUIDE PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago Ill
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
HAMMERS & MALLETS—Rawhide
Chicago Rawhide Mfg. Co., 1280 Elston Ave., Chicago, Ill.
HONING SERVICE
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.
INDICATORS
The Lufkin Rule Co., Saginaw, Mich.
INDICATORS—Dial
L. S. Starrett Co., Athol, Mass.
INDICATORS—Test
L. S. Starrett Co., Athol, Mass.
INDEXING DEVICES
Hartford Special Machy. Co., Hartford, Conn.
LAPS—Copper Head Expansion
Boyar-Schultz, Inc., 2112 Walnut Street, Chicago, Ill.
LAPPING COMPOUND
Carborundum Co., Niagara Falls, N. Y.
LAPPING MACHINES
Schraner & Co., A. P., 3338 Payne Ave., Cleveland, Ohio.
Norton Company, Worcester, Mass.
LEADER PINS
Acme Industrial Co., 206 No. Laflin St., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
MACHINE BASES—Fabricated
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
MACHINE REBUILDING
Enterprise Machine Parts Corp., 2731 Jerome Avenue, Detroit, Mich.
MACHINE VISES
George Gorton Machine Co., 1119—13th St., Racine, Wisconsin.
MAGNETIC PARALLELS AND V BLOCKS
Geo. Scherr Co., Inc., 128-B Lafayette St., New York, N. Y.
MARKING DEVICES
New Method Steel Stamps, Inc., 149 Joseph Campau, Detroit, Mich.
H. O. Bates, 257-261 North Broad Street, Elizabeth, New Jersey.
MARKING PASTE
The Dyken Co., 2201 N. 11th St., St. Louis, Mo.

AMERICA'S DEFENSE PROGRAM
begins in the Die Shop

IT goes without saying that Tool and Die Makers are in our first line of defense. Upon their handiwork depends almost the entire fabric of the enormous manufacturing program of Industry planned for the protection of the United States. In their tremendous task they will need the aid of all possible means for quickening and increasing their output of urgently needed tools and dies.

For several years *Cerromatrix*, the low-temperature-melting alloy that expands slightly on solidifying, has been making substantial savings in die making time for hundreds of the country's leading metal-working shops. Send today for our new free Cerromatrix Manual.

CERRO DE PASCO COPPER CORPORATION
40 WALL STREET • NEW YORK, N.Y.
BRITISH ASSOCIATES: MINING & CHEMICAL PRODUCTS LTD., LONDON, ENGLAND
CANADIAN DISTRIBUTORS: DOMINION MERCHANTS LTD., MONTREAL, CAN.

MICROMETERS
The Lufkin Rule Co., Saginaw, Mich.
L. S. Starrett Co., Athol, Mass.
Geo. Scherr Co., Inc., 128-B Lafayette St., New York, N. Y.

MILLING MACHINES—Attachments
Lockwin & Company, 205 W. Wacker Dr., Chicago, Ill.
Kearney & Trecker Corp., West Allis Station, Milwaukee, Wis.

MILLING MACHINES—Vertical
Geo. Gorton Machine Co., 1119 13th St., Racine, Wisc.
Kearney & Trecker Corp. West Allis Station Milwaukee, Wisc.
Machinery Mfg. Co., P. O. Box 155, Vernon Br., Los Angeles, Calif.
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

MILLING MACHINES—Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

NUMBERING DEVICES
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.

OVENS—Industrial
Despatch Oven Company, 600 S. E. Ninth St., Minneapolis, Minn.

POLISHING & BUFFING MACHINES—Automatic Continuous
Sommer & Adams Co., The, 18511 Euclid Ave., Cleveland, Ohio.

POLISHING GRAIN
Carborundum Co., Niagara Falls, N. Y.
Norton Company, Worcester, Mass.

PUMPS—Vacuum
Vacuum Systems, Inc., 1011 Power Ave., Cleveland, Ohio.

PUNCHES—Hand, Toggle Action
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.

PUNCHES—Standard & Interchangeable
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.

RACKS—Bar Stocks
Wm. S. Yohe Supply Co., 507 Gibbs Ave., N. E., Canton, O.

REAMERS
Putnam Tool Co., 2985 Charlevoix Ave., Detroit, Mich.

REAMER—Self-centering Cylinder
Royal Oak Tool & Machine Co., 621 E. Fourth Street, Detroit, Mich.

REPAIR PARTS FOR MACHINERY
Enterprise Machine Parts Corp., 2731 Jerome Ave., Detroit, Mich.

RETAINERS—Punch & Die
Hovis Screwlock Co., 3129 Larned St., E., Detroit, Mich.

RIVETING MACHINES
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.

RIVETING MACHINES—Hydraulic
Tomkins-Johnson Company, The, 630 N. Mechanic St., Jackson, Mich.

ROLL FEEDS—Automatic
Wittek Mfg. Co., 4305 W. 24th Place, Chicago, Ill.

SAW & SHEAR CUT-OFF MACH.—Automatic
McKinney Tool & Mfg. Co., The, 1688 Arabella Rd., Cleveland, Ohio.

SAWING MACHINES—Continuous
Continental Machine Specialties, Inc., 1303 So. Washington St., Minneapolis, Minn.

SAWING MACHINES—Metal
Armstrong-Blum Mfg. Co., 5757 Bloomingdale Ave., Chicago, Ill.

SAWING MACHINES—Open End
Grob Brothers, Grafton, Wis.

SAWS—Band
DoAll Saw Company, 1203 Thacker St., Des Plaines, Ill.

SCREW MACHINE PRODUCTS—Contract
Star Machine & Tool Co., 9320 Woodland Ave., Cleveland, Ohio.
Ulmer Co., The J. C., 1791 East 38th St., Cleveland, Ohio.

SCREW MACHINE PRODUCTS—Hardened & Ground
Acme Industrial Co., 206 No. Laflin St., Chicago, Illinois.

SCREWS—Socket Head
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
Strong, Carlisle & Hammond Co., 1392 West Third St., Cleveland, Ohio.

SCRIBERS
Ford Motor Co., Johansson Div., Dearborn, Mich.
L. S. Starrett Co., Athol, Mass.

SHARPENING STONES
Carborundum Co., Niagara Falls, N. Y
Norton Company (Behr-Manning Div.), Worcester, Mass.

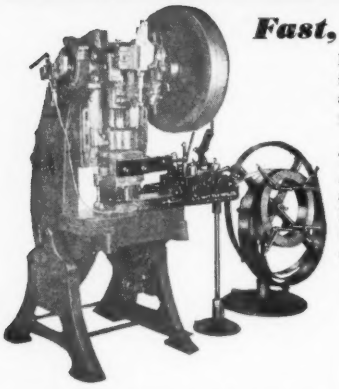
SINE BARS
Ford Motor Co., Johansson Div., Dearborn, Mich.

SPACERS—For Milling Machine Arbors
Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

SPEED PULLEY DEVICES—Variable V-Belt
Speedmaster Co., 1482 Miner St., Des Plaines, Ill.

SPRINGS—Die
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.
Precision Spring Corp., 15400 Woodrow Wilson Ave., Detroit, Mich.

WITTEK ROLL FEEDS
FOR ANY MAKE AND SIZE OF PUNCH PRESS



Fast, Safe, Accurate, Automatic

Maintain production schedules, yet keep costs down, by installing Wittek Roll Feeds—the feeds that have made automatic punch press operation practical on even comparatively short runs.

IMPROVED OPERATING PRINCIPLE

The improved and simplified method of operation of **Wittek Automatic Roll Feeds** eliminates complicated moving parts and insures rapid, smooth and accurate feeding. Single Roll, Double Roll (Push-Pull) and Compound Types, with or without straighteners. **Wittek Roll Feeds** save dies, reduce scrap and cut maintenance costs.

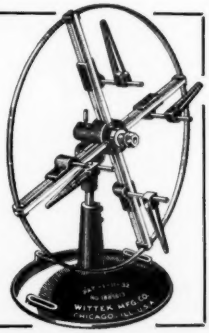
Wittek Roll Feeds can be installed on **any** make or size punch press without alterations, will handle **any** type coiled stock and will feed in **any** of four directions—right to left, left to right, back to front or front to back in any length from 0" to 24" per press stroke at catalog speed or faster.

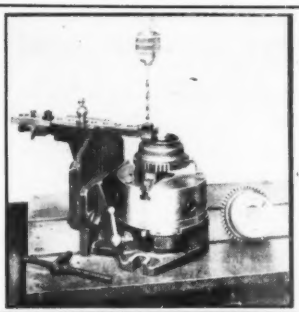
Write for Free Catalog

Wittek Manufacturing Co.
4305 W. 24th Pl. Chicago, U.S.A.

WITTEK ADJUSTABLE Reel Stands

6 types — a type for every job. Will handle any stock (metal, foil, paper, etc.). **Wittek No. 3** (illustrated) has automatically expanding coil holders that center the coil and assure maximum production by eliminating looping, tangling and back-lash of stock.





THE HARTFORD "SUPER-SPACER"

For Milling, Slotting, Drilling or Planing Operations—

The "Super-Spacer" is not only adaptable to so many tool room operations but its quick set-up, rigidity and fool-proof features make it practical for one piece or thousands. The DRILLING ATTACHMENT, which may be quickly secured to the base, has ample adjustment for jobs within its range and is ideal for drilling odd lots of flanges, hubs or other parts where spaced holes on a circle are required. It is equally adaptable for large lot production and will save the cost of many special jigs.

Tool Room Circular No. 2 on request.

THE HARTFORD SPECIAL MACHINERY CO.
HARTFORD, CONNECTICUT

SQUARES—Combination, Try and Mitre
The Lufkin Rule Co., Saginaw, Mich.
L. S. Starrett Co., Athol, Mass.

STAMPINGS
Barth Stamping & Mach. Works, W. 34th & Denison, Cleveland, Ohio.
Davis Tool & Engineering Co., 6481 Epworth Blvd., Detroit, Mich.
Denning Mfg. Co., The, 1775-81 E. 87th St., Cleveland, Ohio
Detroit Stamping Co., 344 Midland Ave., Detroit, Mich.
Federal Tool Corp., 412 N Leavitt St., Chicago, Ill.
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.
Modern Tool & Die Co., P. O. Box 2741, Cleveland, Ohio.
Star Machine & Tool Co., 9320 Woodland Ave., Cleveland, Ohio.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.
Variety Machine & Stamping Co., The, 12695 Elmwood Ave., Cleveland, Ohio.

STAMPS—Steel
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.

STEEL—Alloy
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West Fourth Street Cleveland, Ohio
Forging and Casting Corp., Ferndale (Detroit), Mich.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.

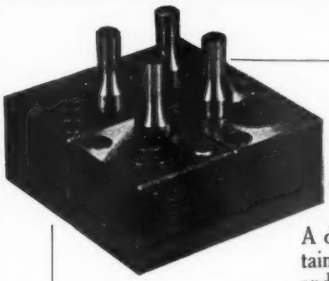
STEEL—Carbon
Columbia Tool Steel Co., 410 East 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West Fourth Street, Cleveland, Ohio.

STEEL—Chromium
Darwin & Milner, Inc., 1260-1264 West Fourth St., Cleveland, Ohio.

STEEL—"Cobalt"
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

STEEL—High Speed
Ajax Steel & Forge Co., 205 Adair St., Detroit, Mich.
Columbia Tool Steel Co., 410 East 14th Street, Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.
Forging and Casting Corp., Ferndale (Detroit), Mich.

STEEL—Tool & Die
Columbia Tool Steel Co., 410 E. 14th St., Chicago Heights, Ill.
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.
Forging and Casting Corp., Ferndale (Detroit), Mich.
Wheelock-Lovejoy & Co., Inc., 130 Sidney St., Cambridge, Mass.



72% SAVED
on 4 HOVIS Retainers

A die required 4 small individual punch retainers. One type had to be specially made and cost $9.00 each—$36.00.

But Hovis Standards were a perfect fit @ $2.50 each—$10.00.

Saving $26.00 or 72%.

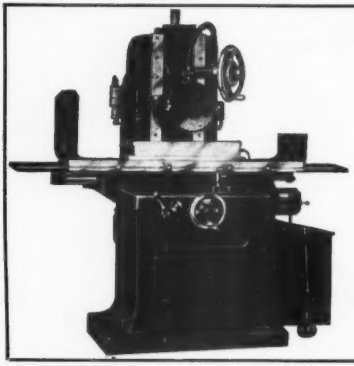
We are doing that right along. Why not let us figure with you?

Easiest to install, quickest to change, longest to wear.

Send for NEW catalog

HOVIS SCREWLOCK CO.
3129 Larned Street East -:- Detroit, Michigan

When you order or write about products described in TDM PROGRESS please mention the publication.



GRAND RAPIDS HYDRAULIC FEED

SURFACE GRINDERS

Provide for Tool Room Accuracy at Production Speeds Built in Many Sizes

New Bulletin GL-100 on Request

GALLMEYER & LIVINGSTON

304 Straight Ave., S. W., Grand Rapids, Mich.

STEEL PLATE—Ground
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

STEEL PLATE—Rough or Machined Torch Cut Shapes
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Die Supply Co., 1390 E. 30th St., Cleveland, Ohio.

STEEL TREATING—Hardening
Lakeside Steel Improvement Co., 5418 Lakeside Ave., Cleveland, Ohio.
Sal-way Steel Treating Inc., 624 W. Elizabeth St., Detroit, Mich.

TAP EXTRACTOR
The Walton Co., 88 Allyn St., Hartford, Conn.

TAPPER—Precision
The Viking Tool & Machine Corp., 6 Main St., Belleville, N. J.

TOOLS—Precision, Diemakers
Lufkin Rule Co., Saginaw, Mich.
L. S. Starrett Co., Athol, Mass.

TOOLS AND DIES—Carboloy
Kiffer Tool & Die Co., 5601 Tillman Ave., Cleveland, Ohio.

TOOLS—Carbide Tipped
McKenna Metals Co., 500 Lloyd Ave., Latrobe, Pa.

TOOL CHESTS
Gerstner Tool Chests, 56 Columbia St., Dayton, Ohio.

TUBING—Tool Steel
Bissett Steel Co., The, 947 E. 67th St., Cleveland, Ohio.

TUBING—Rubber
Atlantic India Rubber Works, Inc., 1453 W. Van Buren St., Chicago, Ill.

TYPE HOLDER
H. O. Bates, 257-261 North Broad St., Elizabeth, N. J.

VALVES—Operating
Hanna Engineering Works, 1759 Elston Ave., Chicago, Ill.

WASHERS—Special
Detroit Stamping Co., 344 Midland Ave., Detroit Mich.

WELDING
Danly Machine Specialties, Inc., 2121 So. 52nd Ave., Chicago, Ill.
Star Tool & Die Works, 2522 24th St., Detroit, Mich.

WELDING PLIERS
Knu-Vise, Incorporated, 16841 Hamilton Ave., Highland Park, Michigan.

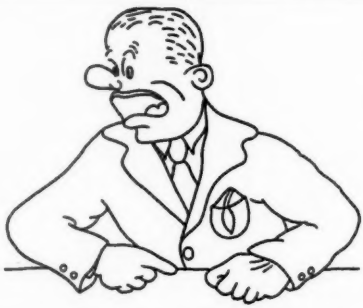
WELDING RODS
Darwin & Milner, Inc., 1260-1264 West 4th St., Cleveland, Ohio.

ACME

There is

No Need To Bellyache

When You Buy



ACME DRILL JIG BUSHINGS

High quality and prompt delivery insure against "bellyaching", save tempers, and release your men for more important work.

Shipments made from complete stock of both A.S.A. and Acme Standards. *Write for catalog.*

ACME INDUSTRIAL COMPANY

206 N. Laflin St., Chicago, Ill. MONroe 4122

When you order or write about products described in TDM PROGRESS please mention the publication.

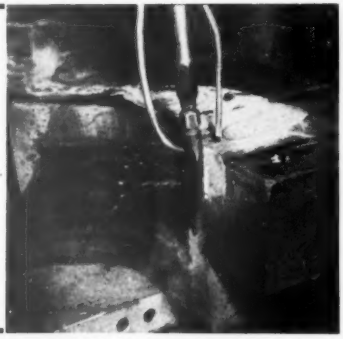
FLAME HARDENING, *the modern* STEEL-TREATING METHOD

Hardening with the oxyacetylene flame by direct application is fast, efficient and economical for numerous parts and products. Research carried on by Lakeside assures uniformity of treatment. We maintain the finest equipment for spot, progressive and spinning operations. With our new automatically controlled furnaces we offer a complete heat treating service —including Nitriding, Chapmanizing, Aerocasing, Carburizing and Cyaniding.

24 Hour Service — Call HEnderson 9100

The LAKESIDE STEEL IMPROVEMENT CO.
5418 Lakeside Ave. Cleveland, O.

Flame hardening a die ⟶



The Design of an Ejector-Pin Type of Injection Mold

(Continued from Page 24)

ground, or hard. The ejector assembly moves back and forth in the ejector box; the travel is shown at detail 25. When the press opens the ejector rod (detail 1) hits a stop and pushes the assembly forward to the limit of the travel. The travel is sufficient to push the piece off the core. When the mold closes, the return pins (detail 7) are projecting from the retainer plate (detail 10) the amount of the travel. They hit the face of the retainer plate (detail 13) and push the assembly back to the molding position. The ejector assembly can hang on the pins, and the plates (details 27 and 28) can clear the sides of the box (detail 6). In this mold, the ejector box is square, and four spacers are used to form the box. The screws (detail 5) are used to hold the spacers to the adaptor plate (detail 3). This is for convenience in assembling. The ejector box may be made round and bored out from a solid block to include the adaptor plate, if the mold is not too large.

The Adaptor Plates

The ejection end adaptor plate (detail 3) in this mold may be made of cold rolled steel. It has a clearance hole in the center for the ejector rod. A circular mounting boss (detail 2) is turned on the back. One type of press platen has an arrangement for clamping the adaptor plates, and the clamping slot is shown at detail 4. The plate is drilled and tapped for the retainer screws (details 5 and 29) as shown.

The injection end adaptor plate (detail 19) serves as a cavity backing plate as well, and should be of alloy steel for severe service. It has a mounting boss (detail 15) to fit the press platen. It is bored out to allow the injection nozzle to come in contact with the sprue bushing (detail 16). Holes are drilled for the retainer screws (detail 14).

Both adaptor plates should be ground to assure parallel mounting in the press.

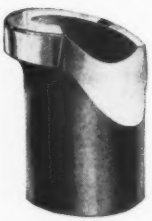
Sprue, Runners, and Gates

The material is introduced into the mold through the sprue; the tapered hole in the sprue bushing is shown as detail 16. From the sprue, it flows through the six runners (detail 17) and the gates, shown by a small notch in the cavity block at the end of the runner. The sprue bushing is made of alloy mold steel and is hardened. At the head end, a small depression is machined to fit the particular type of nozzle preferred by the molder.

CORRECTION

In the July installment "Types of Compression Molding," an error was made in the placing of the illustrations for Fig. 7 on page 22 and Fig. 9 on page 23. The cuts only should have been reversed; Fig. 7 actually illustrates the Flash Type Mold and Fig. 9, the Positive Type Mold. Several of our readers have called this error to our attention. ***—The Editor.***

When you order or write about products described in TDM PROGRESS please mention the publication.



Style B

BOKUM Facing and Bottoming Tools

STYLE B permit machining bore and facing bottom in same operation. Also used for removing radius in bottom of blind holes.

BOKUM Plain Boring Tools

STYLE A scientifically formed cutting edges give guaranteed, consistent performance. Life equal to six normally-forged tools.

Bulletin, with prices, on Request

BOKUM TOOL CO., INC. 49 W. HANCOCK ST. DETROIT, MICH.

Licensed manufacturers of all types and designs of Carbide Tipped Tools.

Style A

Gorton Completes Addition

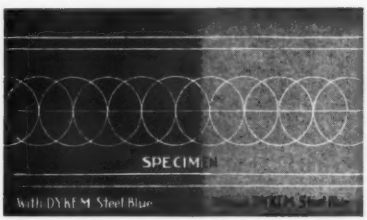
The George Gorton Machine Co., Racine, Wis., manufacturers of milling, die and mold duplicating and engraving machines, announces the completion of a new 12,000 square foot factory addition. The new structure houses the assembly and shipping departments and a new stock room.

The building, designed by Albert Kahn, Inc., Detroit, features the latest type of Cooper Hewitt Fluorescent Lighting and a blue tinted glass that eliminates sun glare, and is designed so that further additions may be added on with a minimum of expense.

Although the building is primarily to relieve congestion in the assembly department, the Company's machine output is expected to rise about twenty-five percent.

Weldon Takes Over Manufacture of TU-LIP Counterbore

The Weldon Tool Co., Cleveland, O., announces that the TU-LIP Counterbore, formerly made by The Gopher Machine & Tool Works Company of Minneapolis, Minn., will be exclusively manufactured and distributed by them under the name of Weldon TU-LIP Counterbore.



DYKEM STEEL BLUE
STOPS LOSSES
making dies & templates

Simply brush on; ready for the layout in a few minutes. The dark blue background makes the layout lines show up in a sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY
2201 N. 11th STREET ST. LOUIS, MO.

When you order or write about products described in TDM PROGRESS please mention the publication.

Help Wanted

SALES REPRESENTATIVE

Illinois, Wisconsin, Pacific Coast. Rapidly growing machine tool attachment. Sales already proving possibilities of $2000 machine tool attachment in coming defense program. Representative calling on tool and die shops and having knowledge of machine tools. Give lines now being handled, experience, engineering qualifications. Box 6, TDM PROGRESS, 2460 Fairmount Blvd., Cleveland, Ohio.

Jessop Steel Adds Two Representatives, Transfers Another

T. W. Pennington, sales manager for Jessop Steel Co., Washington, Pa., announces further expansion of the sales staff with the appointment of two new representatives. T. E. Cook has been appointed sales representative in the Chicago district with headquarters at 1742 Carroll Ave., Chicago, Ill. J. W. Stranahan has been appointed to the Cleveland district with headquarters at 1210 East 55th St., Cleveland, Ohio.

C. E. Spragg, formerly in the New York office of the company, has been transferred to the Boston district with headquarters at 626 Capitol Ave., Hartford, Conn.

A Versatile

TOOL ROOM FURNACE

As handy as a work bench, this new Despatch tool room furnace is ideal for small tools, dies, etc.

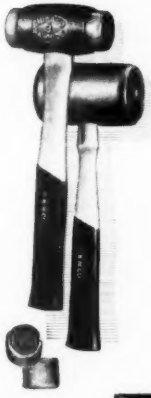
Sturdy construction . . . takes up little space . . . yet ample size for quantities of small objects . . . a practical furnace which meets a long-felt need.

Write today for NEW BULLETIN

DESPATCH OVEN COMPANY MINNEAPOLIS, MINN.

FOR...

"SETTING-UP" DIE MAINTENANCE ASSEMBLY



Careful work—the protection of valuable equipment and dies against damage—requires good tools. Chicago Rawhide Hammers and Mallets are not only good tools, but from a standpoint of accuracy, efficiency, and economy there are none better—none that are as satisfactory. With faces of compressed Java Water Buffalo Hide (replaceable in the hammers), they are perfect in resiliency, hardness, balance and accuracy . . . for every requirement where effective blows must strike "softly." Ask your supply house for a demonstration — now.

CHICAGO Rawhide MFG. CO.
1280 ELSTON AVE · CHICAGO · U·S·A·

LUFKIN CHROME FACE

Jet black markings on the satin chrome surface are easy to read even in poor or artificial light. The smooth chrome surface won't rust, crack, chip or peel. That's why you should own a new Lufkin Chrome Face Steel Tapes.

Write for free general catalog.

LUFKIN

SAGINAW, MICHIGAN · New York City

TAPES · RULES · PRECISION TOOLS

When you order or write about products described in TDM PROGRESS please mention the publication.

Tool · Die · Machine CONTRACT SHOPS

Modern facilities for every type of designing and building service. Die Shop, Tool Room, Stamping, Assembly and Production work. All will appreciate inquiries for types of work indicated.

Chicago, Illinois

***FEDERAL TOOL CORPORATION**
412 North Leavitt St. HAYmarket 2150
Tools Dies Jigs Fixtures
Stampings Special Machinery

Detroit, Michigan

DAVIS TOOL & ENGINEERING COMPANY
6481 Epworth Blvd. TYler 46070
TOOLS and DIES
Special Machinery
Sheet Metal
Stampings and Assemblies

ENTERPRISE MACHINE PARTS CORP.
Jerome Ave. at McNichols Rd. E. TOwnsend 8-9643
PRODUCTION MACHINE REPAIR PARTS
Motor Drives, Gears, Worms, Tools, Fixtures
Machine Overhaul Specialists

***KOESTLIN TOOL & DIE CORPORATION**
3605 Humboldt Ave. Detroit, Mich.
Manufacturers
Sheet Metal Dies "Grindrite" Die Grinders

MAJESTIC TOOL & MFG. COMPANY
2948 Woodbridge St., East FItzroy 1011
Manufacturers
General line of Tool and Die Work, Tool Details, Parker High Speed Grinding Spindles

NORTHEASTERN ENGINEERING CO.
3125 E. Larned St. FItzroy 1275
Specialists in the Designing and Building of Progressive Dies
Dies—Tools—Special Machinery

ROBBINS ENGINEERING COMPANY
637 Mt. Elliott Ave. Fitzroy 4740
Designers and Manufacturers
Tools, Dies, Jigs, Fixtures
Special Machinery and Experimental Work

ROYAL OAK TOOL & MACHINE CO.
621 E. Fourth St., Royal Oak, Mich. ELmhurst 6580
Manufacturers of
Tools, Dies, Jigs, Fixtures. Special Machinery and Designing. Hoch Self-Centering Cylinder Reamers

*See larger display advertisement also.

STAR TOOL & DIE WORKS
2522-24th St. LAfayette 1716
BUILDERS of DIES
Facilities for the Largest
MANUFACTURERS
of STAMPINGS

Cleveland, Ohio

BARTH STAMPING & MACH. WORKS
W. 34 & DENISON FL. 8411
DIES—TOOLS—JIGS—MOLDS
GLENN A. BARTH THOM. A. BARTH
J. A. BARTH J. J. BARTH

***THE BUNELL MACHINE & TOOL CO.**
1620 East 24th St. PRospect 2681
DIES—JIGS—FIXTURES
Gages—Models
SPECIAL MACHINERY
Swiss Jig Boring
Screw Machine Products

CLEVELAND UNIVERSAL JIG COMPANY
13404 St. Clair Ave. MUlberry 3322
Designers and Builders
Jigs & Fixtures Special Machines
Production Engineering
COMPLETE PLANT
ROUTING and TOOLING

THE DENNING MANUFACTURING COMPANY
1775-81 East 87th St. CEdar 0801
Designers and Builders
HIGH GRADE DIES

GENERAL DIE & TOOL COMPANY
2067 W. 55th St. WOodbine 4736
Dies Tools Jigs Fixtures
Light Stampings Manufacturing Special Machinery

When you order or write about products described in TDM PROGRESS please mention the publication.

HAHN MANUFACTURING COMPANY
5332 Hamilton Ave. ENdicott 2205
Modern equipped shop for building of
MEDIUM AND LARGE
DIES, TOOLS, SPECIAL MACHINERY
Equipment includes:
3" and 5" spindle Horizontal Boring Mills
Large planers Vertical Mill

THE INDUSTRIAL MACHINE CO.
1436 East 47th Street Founded in 1903
Builders of Special Machinery
GENERAL MACHINE WORK

KIFFER TOOL & DIE CO.
5601 Tillman Ave. WOodbine 2440-2441
Manufacturers Special Machinery
Tools, Dies, Jigs, Fixtures, Tungsten Carbide Tools
SWISS JIG BORING

THE McKINNEY TOOL & MFG. CO.
1688 Arabella Rd. KEnmore 1681
Roller Die Forming Machines
Automatic Saw and Shear Cut-off Machines
Special Machinery—Dies, Jigs, and Fixtures
Jig Boring—Precision Machine Parts

MODERN TOOL & DIE CO.
P. O. Box 2741
West Park Branch CLearwater 6410
DESIGNERS AND BUILDERS
Tools and Dies *Special Machinery*
STAMPINGS

OHIO TOOL COMPANY
3160 West 106th St. CLearwater 3200
Designers and Builders
SHEET METAL DIES, TOOLS, SPECIAL MACHINERY, DIE CASTING DIES
RUBBER MOULDS
•
Modern Facilities
150-Man Shop

*See larger display advertisement also.

THE PARAMOUNT TOOL CO.
1392-98 East 43rd St. ENdicott 2220
JIGS, FIXTURES, DIES
Experimental Work

The PHOENIX MACHINE COMPANY
2711 Church Ave. CHerry 1048
CONTRACT GRINDING
BORING and PLANING
Manufacturers of
LESTER-PHOENIX DIE CASTING AND PLASTIC MOLDING MACHINES

A. P. SCHRANER & COMPANY
3338 Payne Ave. HEnderson 8644
EXTERNAL CYLINDRICAL
LAPPING MACHINES
Special Machinery
TOOLS, DIES, JIGS, FIXTURES

***THE SOMMER & ADAMS CO.**
18511 Euclid Ave. KEnmore 0810-0811
DESIGNERS AND BUILDERS
Special Machinery
TOOLS, JIGS and FIXTURES

***STAR MACHINE & TOOL COMPANY**
9320 Woodland Ave. GArfield 2060
Designers and Builders
Dies, Jigs, Fixtures, Gages, Special Machinery
Jig Boring—Planer Equipment

TOOLS & GAGES, Inc.
3106 East 63rd St. MIchigan 7230
"Let us be your tool room."
DESIGNERS AND BUILDERS
Tools, Gages, Dies, Jigs, Fixtures
Special Machinery
SWISS JIG BORING
DIE CASTING DIES

Directory Continued on Next Page

CAMS CAMS CAMS

Our Patented Process of Cutting Master Cams direct from a blue print eliminates charting, experiments and development time in your shop, speeds your delivery schedules and costs you less.

The Schmidt Cam Compensator is the first precision device for the rapid and economical cutting of all sizes and types of cams.

Send prints for prompt quotation.

R. J. SCHMIDT CO. Gen. Office, 227 Colonial Arcade
Phone: MAin 1799 Cleveland, Ohio
"Cam Development Specialists"

When you order or write about products described in TDM PROGRESS please mention the publication.

(Continued from Page 45)

THE VARIETY MACHINE & STAMPING COMPANY
12695 Elmwood Ave. LAkewood 8433
Designers and Manufacturers
Dies, Metal Stampings 250 tons capacity

Hamilton, Ohio

•THE HAMILTON TOOL COMPANY
220-222 North B Street
Designers and Builders of
Tools, Dies, Jigs, Fixtures, Special Machinery
The Hamilton Portable Elevating Table

New York City, N. Y.

THE S & R FOLDING MACHINE COMPANY, INC.
841 E. 134th St. Melrose 5-7830
Economical Machine Work Done.
Let us quote on producing machine parts for you. We are equipped to do GENERAL MACHINE WORK *of all types.*

Knu-Vise Introduces Knu-Kam-Klamp

KNU-VISE, Incorporated, manufacturer of rapid action clamps, pliers and other holding devices, announces the Knu-Kam-Klamp, a new toggle clamp employing cam rollers. The action is similar to the regular toggle clamp in that the clamping bar is hinged at one end, the same type of operating handle and the same member for attaching to a fixture is used.

The link connecting the handle to toggle bar is slotted to permit this bar to be withdrawn rapidly from the work and has no actual part in the clamping operation. The upper portion of the toggle or clamping bar is machined to a cam surface against which two rollers are in contact at all times. When the handle is in the vertical position these rollers are contacting the low part of the cam surface and the toggle bar is in the maximum position to take the thickest part being held in the fixture. Continued swinging of the handle forces these cam rollers against the rise of the cam so that the toggle bar is eventually in the minimum clamping position.

The Knu-Kam-Klamp, made in two sizes, and both interchangeable with the

standard type No. 110 and the No. 250 toggle clamps, are applicable to numerous tool room and die shop clamping operations and have the particular advantage of clamping stock of more than one thickness at one set-up.

For specifications on the new Knu-Kam-Klamps write Knu-Vise, Inc., 16841 Hamilton Ave., Highland Park, Mich.

GERSTNER CHESTS

When you buy a Gerstner Chest you receive a life-time of helpful service that always pleases. We invite you to examine our Free Catalog.

GERSTNER TOOL CHESTS
56 Columbia St. Dayton, Ohio

HANDY RACKS

Now available in 4-Arm, 51" high or the new 5-Arm-Racks, 57" high. Used wherever flat or round bar stock or tubing is kept—factories, warehouses, schools, large & small shops. Four times the usual capacity for the floor or height space. Low cost, & money or space saved.

Send for priced circular.

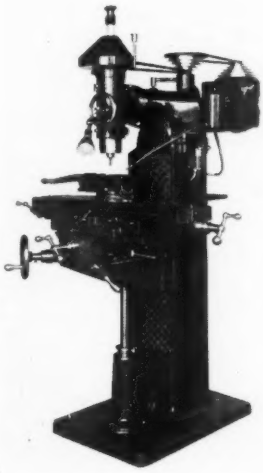
Wm. S. Yohe Supply Co.
507 Gibbs Ave., N. E.
CANTON, OHIO

A COMPLETE NEW CATALOGUE
BY THE
DESIGNERS — ENGINEERS — MANUFACTURERS
OF MOLDED RUBBER PRODUCTS
Showing Thousands of Rubber Parts
OFFER YOU
Bumpers — Bushings — Rolls — Extrusions — Gaskets —
Grommets — Washers — Rings — Sheet — Slab — Spring —
Sponge — Molded Tires — Tubing — Vacuum Cups, Etc.
For Prompt Shipment From Stock.
Our designers and engineers are at your service to solve your special rubber problems in perfecting new machines. Ask for Catalog 21P.
All Phones: HAYmarket 7093

ATLANTIC INDIA RUBBER WORKS, INC.
1453 WEST VAN BUREN STREET · CHICAGO, ILLINOIS.

Midway Offers High Speed, Wide Range Vertical Milling Machine

MIDWAY Machine Company of St. Paul, Minn., announce the No. 2½ "Millmaster" Vertical Milling Machine, a high speed, wide range tool designed for production milling as well as many tool room and die shop operations.



The "Millmaster" has many features not found on machines in its price range. The spindle, of chrome-nickel steel, normalized before finish machining, is machined for No. 9 B & S Taper. A ¾" draw-in collet maximum capacity and end-mill capacity from ⅛" to 3" is provided. The 7" outside diameter swivel has a full 180° movement, graduated in degrees. Main spindle and spindle pulley bearings are PRE-LOADED duplex oversize ball-bearings. Oil feed reservoir cups are provided at all bearing surfaces.

The 9" x 34" table, working size 9" x 26", has a vertical feed of 30" with telescopic screw, a longitudinal feed of 18", and a transverse feed of 10", both with Acme lead-screw. All feeds are manual, all lead-screws have graduated collars for micrometer adjustments of feeds and hand lock levers. All gibs are oversize and table has stop-lock for

(Continued on next Page)

H. O. BATES
TOUGH
STEEL LETTERS & FIGURES, NUMBERING MACHINES, MARKING MACHINES, STAMPS & DIES
. . .
MARKING PROBLEMS INVITED
. . .
SEND FOR LATEST CATALOG
H. O. BATES, MARKING DEVICES
257-261 North Broad Street
ELIZABETH, N. J.

(Patented)

Also Special Sizes

Move heavy dies, jigs and fixtures more quickly, economically and safely *with the*

HAMILTON PORTABLE ELEVATING TABLE

Eliminate costly mishaps and breakage . . . Is a labor saver because it requires only one man to handle . . . Levels and supports overhanging pieces of work . . . Safe — Indispensable - Inexpensive . . . Two regular sizes: 2,000 pounds and 5,000 pounds.

Write for circular and prices

THE HAMILTON TOOL COMPANY

222 North B Street Hamilton, Ohio

Tamms Offers New Layout Dope

THE Tamms Silica Company, Chicago, Illinois, have recently developed a new layout material, "Tamms' Blue Layout Dope", for tool and die makers use. It comes in liquid form, quick drying and will not rub off. The new dope is low in price and economical to use. Samples are available on request. A scribe or layout tool shows a clear, distinct line without chipping or cracking off. Tamms is also announcing a new type Blue Chalk for checking leaks in castings.

For a sample of "Tamms' Blue Layout Dope" write the Tamms Silica Company, 228 N. La Salle St., Chicago, Illinois.

Columbia Promotes Sonderman

The Columbia Tool Steel Co. has appointed W. G. Sonderman as manager of the Company's Cincinnati branch located at 2716 Spring Grove Avenue. Mr. Sonderman, who has been with the Columbia organization for over 20 years at the Cleveland branch, succeeds Mr. F. A. Terry, who has retired.

Midway Vertical Milling Machine

(Continued from Page 47)

horizontal setting to pre-adjusted position. All column, knee, saddle and table ways are "V" shaped for maximum precision and long wear.

The "Millmaster" is furnished for two pulley operation, developing 17 spindle speeds from 275 to 4300 rpm with a third pulley, furnished as an accessory, 44 speeds from 70 to 10,000 rpm are available.

Tool rooms and die shops will find the "Millmaster" indispensable for die-sinking and metal routing. Boring, drilling and grinding operations, as well as milling, make this machine tool of particular value to the smaller shop as well as the larger department where it can be set up for single purpose work. In addition to the Standard Model, which is fully equipped, a De Luxe Model with movable quill and other features is available.

For an illustrated circular giving full specifications on the No. 2½ "Millmaster" Vertical Milling Machine, write Midway Machine Co., 2325 University Ave., St. Paul, Minn.

DON'T CUSS when your taps break off . . . . .

THE WALTON TAP EXTRACTOR will remove them easily and quickly

No longer necessary to anneal the broken tap. The steel fingers of the Extractor, inserted in the flutes of the broken tap, remove the broken piece intact. Made in all standard sizes from No. 4 to 1½".

THE WALTON CO.

88 Allyn Street Hartford, Conn.

Will you give it a 30 days free trial? Ask for Folder 131.

When you order or write about products described in TDM PROGRESS please mention the publication.

DOWEL PINS

We maintain an unusually large stock of Dowel Pins—including many sizes not ordinarily carried.

When you need Dowel Pins, try Die Supply first. Prompt and dependable delivery.

Ask for Accessories Catalog

DIE SUPPLY COMPANY

1390 E. 30th St. Cleveland, O.

Schmidt to License Compensator

(Continued from Page 32)

years old and protected by patents, the original model has cut over 200 cams without a failure. In addition to the new plan for licensing its use, the Schmidt Company maintains a Cam Service Department. The advantages of being able to escape the cam building "bottle-neck" and at the same time assured of a lower cost, makes the use of this Department a real economy to every cam user.

The Schmidt Company is the first, and as far as is known, the only company specializing in a master cam cutting service.

For full information on the new Cam Compensator licensing plan or direct Cam Service, write the R. J. Schmidt Co., 227 Colonial Arcade, Cleveland, O.

A "Dictionary of Occupational Titles" prepared by the United States Employment Service lists 29,744 job titles.

* * *

When it is remembered that the tooling (design, building and installation for production) for the average motor car covers approximately 15 months, the complete tooling for a much more complex aviation engine in 8 or 10 months is a real achievement.

Design of Production Dies—Tools

Consulting and design service on high production progressive and compound dies, also production tools and special machinery. Inventions commercialized.

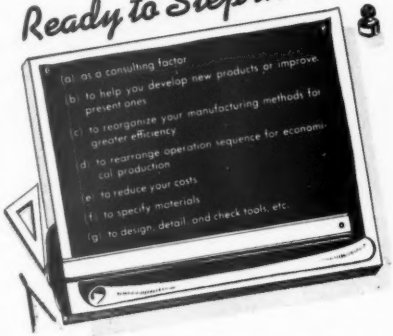
Quotations on design or tool costs for stampings furnished on request.

E. V. TAYLOR, Mechanical Engineer

111 W. Washington St., Chicago, Ill.

A Complete Engineering Staff

Ready to Step in . . .

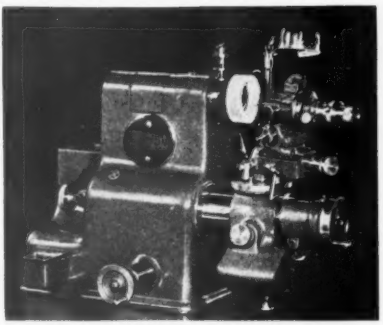

(a) as a consulting factor
(b) to help you develop new products or improve present ones
(c) to reorganize your manufacturing methods for greater efficiency
(d) to rearrange operation sequence for economical production
(e) to reduce your costs
(f) to specify materials
(g) to design, detail, and check tools, etc.

You can avail yourself of all or any part of this service — as your circumstances dictate — to relieve your personnel of a vast amount of detail work and leave its routine undisturbed.

PIONEER ENGINEERING

AND MANUFACTURING CO.

33 MELBOURNE AVE. DETROIT MICH.



CUTTER GRINDER

Send for Gorton Accessories Catalog and secure complete data on this precision grinder for small End Mills. Bench and floor models. Simple, rapid, and accurate . . . a time and money saver. Write today.

George Gorton Machine Co.

1119-13th Street

RACINE WISCONSIN

When you order or write about products described in TDM PROGRESS please mention the publication.

ALLOY
HY-TEN
STEELS

Immediate Shipment from Seven Warehouses

ALLOY
S. A. E.
STEELS

Reduce your tool and die costs with *Hy-ten "M" Temper, .70 Carbon Cr-Ni-Moly* oil hardening alloy steel. Extreme toughness at high degrees of hardness. Rounds, squares and flats in stock. Forgings of all types.

Send for descriptive folder

CHICAGO **WHEELOCK, LOVEJOY & CO., INC.** DETROIT
CAMBRIDGE CLEVELAND NEWARK CINCINNATI BUFFALO

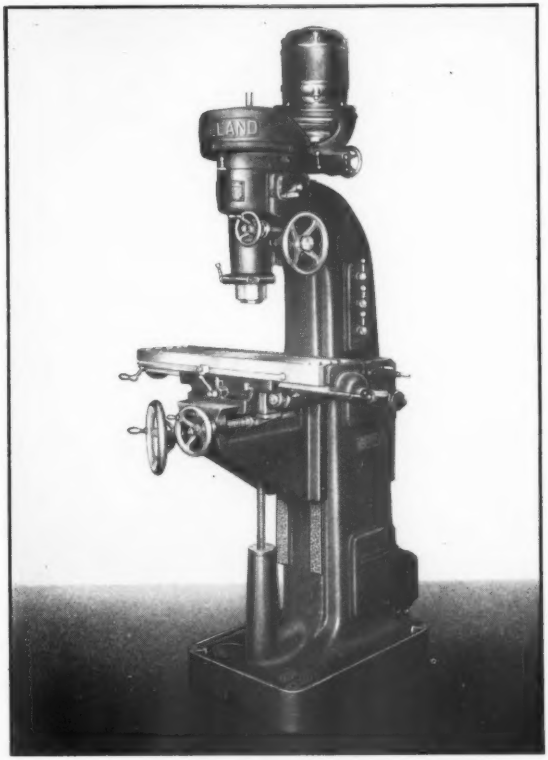
DIE ESTIMATING
By George Dannes
Tool-Die-Machine PROGRESS

An Accurate, Practical Method of Pre-Determining die building costs by Shop Time Value Tables. Tables and estimating sheets furnished separately. *Price $1.55 postpaid*
2460 Fairmount Blvd., Cleve., O.

Advertisers Index

Acme Industrial Company 40
Ajax Steel & Forge Co. 36
Armstrong-Blum Mfg. Co. ..... Back Cover
Atlantic India Rubber Works, Inc. 47
Baker Bros., Inc. .....
Barth Stamping & Machine Works 44
Bates, H. O. 47
Bissett Steel Company 37
Bokum Tool Co., Inc. 42
Boyar-Schultz Corp. 11
Builders Iron Foundry .....
Bunell Machine & Tool Company ..... 33 and 44
Carborundum Co. 10
Cerro de Pasco Copper Corporation 37
Chicago Rawhide Mfg. Co. 43
Cleveland Universal Jig Company 44
Colonial Bushings, Inc. 42
Columbia Tool Steel Co. 34
Continental Machines, Inc. 5
Danly Machine Specialties, Inc. 8
Darwin & Milner, Inc. .....
Davis Tool & Engineering Company 44
Dayton-Rogers Mfg. Co. .....
Denning Manufacturing Company 44
Despatch Oven Co. 43
Detroit Alloy Steel Co. .....
Detroit Stamping Company 21
Die Supply Co. ..... 12 and 49
DoAll Saw Company 13
Drive-All Manufacturing Co. 9
Dumore Co., The .....
Dykem Co. 42
Enterprise Machine Parts Co. 44
Federal Products Corp. .....
Federal Tool Corp. ..... 35 and 44
Foley Manufacturing Co. .....
Ford Motor Co., Johansson Div. .....
Forging and Casting Corporation 3
Gallmeyer & Livingston Co. 40
Gear Specialties, Inc. .....
General Die & Tool Co. 44
George Gorton Machine Co. ..... 27 and 49
Gerstner and Sons, H. 46
Greenerd Arbor Press Co. .....
Grob Brothers .....
Grobet File Corp. .....
Hahn Manufacturing Company 45
Hamilton Tool Company ..... 46 and 48
Hanna Engineering Works .....
Hartford Special Machinery Co. 39
Hovis Screwlock Company 39
Illinois Tool Works .....
Industrial Machine Company 45
Kearney & Trecker Corp. 14
Kiffer Tool & Die Co. 45
Knu-Vise, Inc. 31
K-O Products Co. .....
Koestlin Tool & Die Corp. .....
..... Inside Front Cover and 44
Lakeside Steel Improvement Company 41
Lockwin & Company .....
Lufkin Rule Co. 43
Lyon Iron Works .....
Machinery Mfg. Co. .....
Majestic Tool & Mfg. Co. 44
Master Chrome Service, Inc. .....
McKenna Metals Co. .....
McKinney Tool & Manufacturing Co. 45
Meehanite Research Institute .....
Modern Tool and Die Company 45
Monarch Machine Tool Co. .....
National Industrial Advertisers Association 32
New Method Steel Stamps, Inc. .....
Northeastern Engineering Company 44
Norton Company 6
Ohio Tool Company 45
Oliver Instrument Co. .....
Onsrud Machine Works, Inc. .....
Paramount Tool Company 45
Phoenix Machine Company 45
Pioneer Eng. & Mfg. Co. 49
Precision Spring Corp. 26
Putnam Tool Co. ..... Front Cover
Robbins Engineering Co. 44
Ross Operating Valve Co. .....
Royal Oak Tool & Machine Company 44
S & R Folding Machine Co., Inc. 46
Sal-Way Steel Treating, Inc. .....
Geo. Scherr Co., Inc. .....
R. J. Schmidt Co. 45
Schraner, A. P. & Company 45
Siewek Tool Co. .....
Sommer & Adams Co. .....
..... Inside Back Cover and 45
South Bend Lathe Works 7
Star Machine & Tool Company ..... 29 and 45
Star Tool & Die Works 44
L. S. Starrett Co. 25
Strong, Carlisle & Hammond Co. 4
Taylor, E. V. 49
Tomkins-Johnson Co. .....
Tools & Gages, Inc. 45
Vacuum System, Inc. .....
Variety Machine & Stamping Company 46
Viking Tool & Machine Corp. 34
Walton Company 48
Wheelock, Lovejoy & Co. 50
Wittek Manufacturing Co. 38
Yohe Supply Co., Wm. S. 46

The CLEVELAND No. 1
VERTICAL MILLING MACHINE



A standard high-speed Vertical Spindle Milling Machine designed to meet the most exacting requirements; built to give the highest standard of performance.

Specifications and full information on request

THE SOMMER & ADAMS COMPANY
18511 Euclid Avenue — Cleveland, Ohio

Representatives

JOHN E. LIVINGSTONE & CO.
2921 E. Grand Blvd., Detroit
and Windsor, Ont.

NEFE-KOHLBUSH & BISSELL
2257 W. Madison Street
Chicago

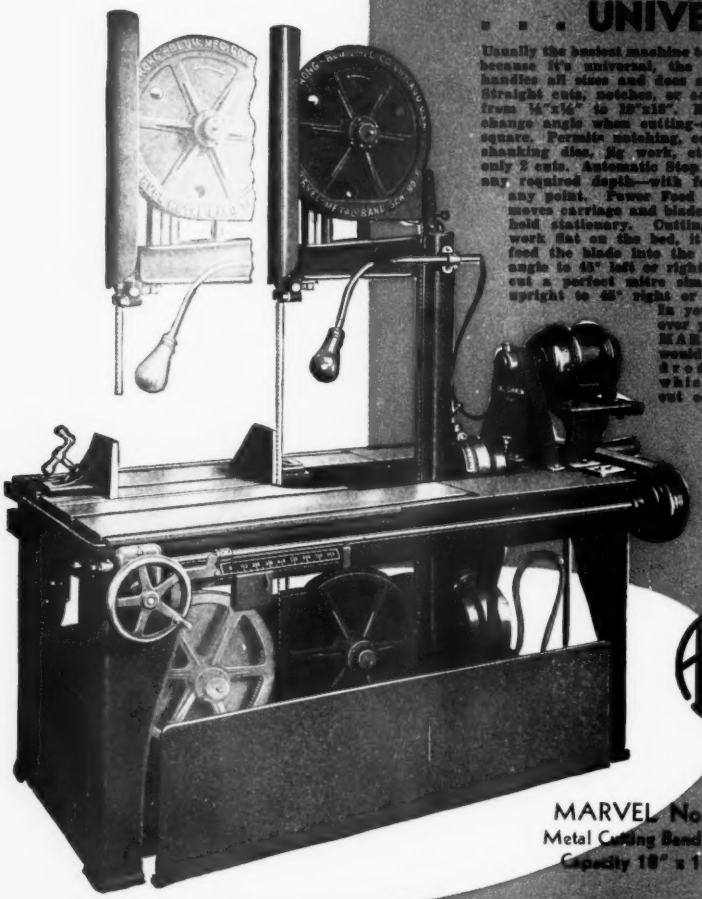
E. H. JONES (Machine Tools) Ltd.
Edgware Road, Hyde
London, England

MARVEL SAWS

The Saw "With 100 Uses" . . . UNIVERSAL

Usually the busiest machine tool in any shop because it's universal, the Marvel No. 8 handles all sizes and does all things well. Straight cuts, notches, or copes any stock from ⅛"x⅛" to 18"x18". Blade does not change angle when cutting-off straight or square. Permits notching, coping, slotting, shanking dies, jig work, etc., by making only 2 cuts. Automatic Stop can be set for any required depth—with feed started at any point. Power Feed or Hand Feed moves carriage and blade. Work always held stationary. Cutting Angles with work flat on the bed, it is possible to feed the blade into the work at any angle to 45° left or right. Example: to cut a perfect mitre simply swing the upright to 45° right or left.

In your shop, what ever your work, the MARVEL No. 8 would find a "hundred uses" on which it would cut costs.



MARVEL No. 8
Metal Cutting Band Saw
Capacity 18" x 18"

ARMSTRONG-BLUM MFG. CO. "The Hack Saw People" CHICAGO
5757 BLOOMINGDALE AVENUE